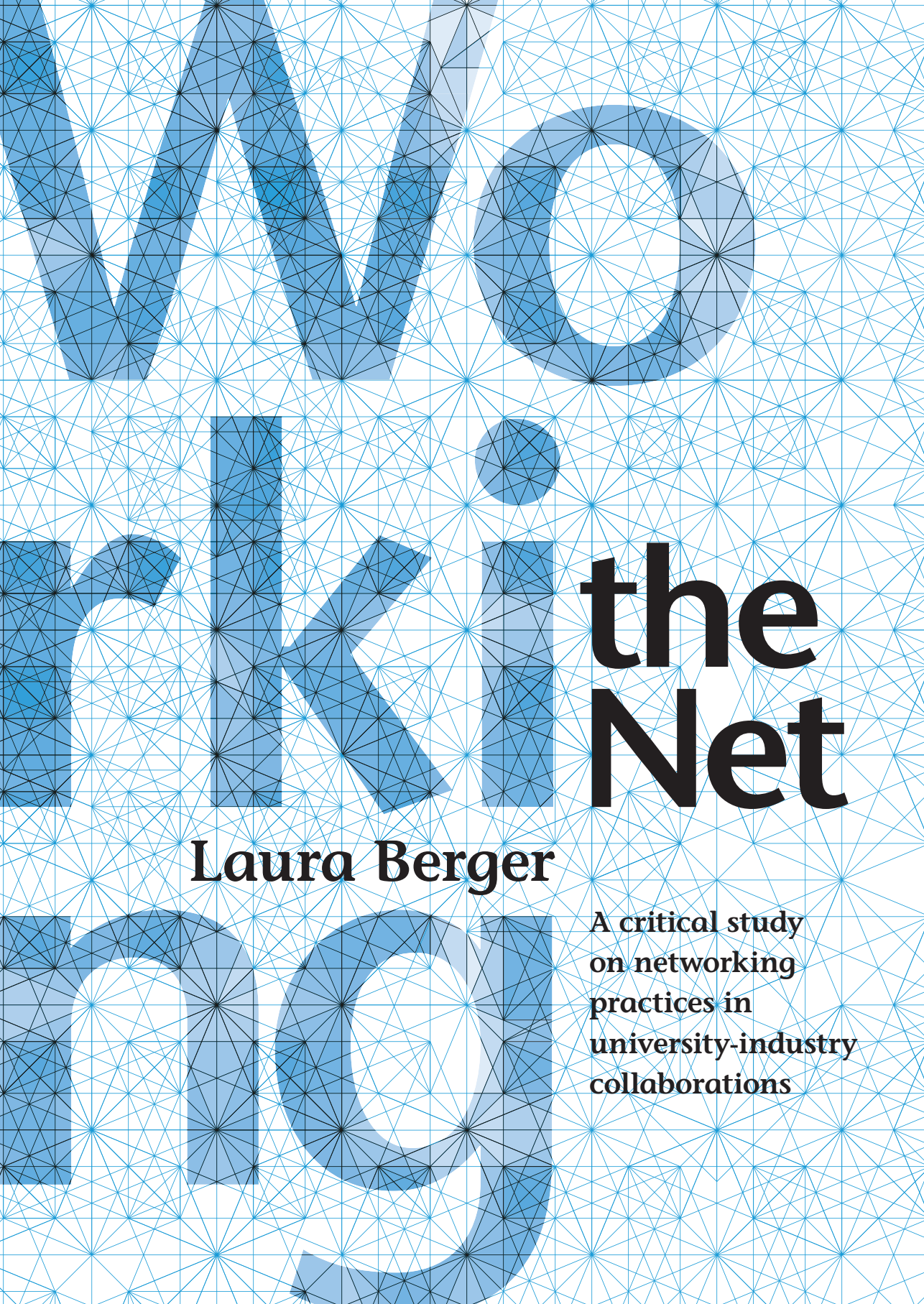
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Laura Berger
A critical study
on networking
practices in
university-industry
collaborations

Working the Net

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Laura Berger

Working the Net

A critical study on networking practices in university-industry collaborations

Colofon

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te Amstelveen

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If you knew what you were doing, it wouldn't be called research.

Einstein

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Dankwoord (Acknowledgements – in Dutch)

Je hebt in handen, of op scherm, het resultaat van 4,5 jaar werk aan mijn promotieproject: mijn proefschrift. Over het proces hiernaartoe kan ik veel vertellen, maar zoals doorgaans het geval, zegt een beeld - in dit geval een comic - meer dan 1000 woorden:

Hoewel deze comic de werkelijkheid zeker geen geweld aandoet, geeft het natuurlijk niet de gehele waarheid weer. Noem het beroepsdeformatie, maar ik had dit proefschrift nooit kunnen afronden zonder hulp van mijn netwerk, mijn "sociaal kapitaal", mijn instrumentele en affectieve inter-persoonlijke relaties die mij door het proces geholpen hebben. Ik heb het natuurlijk over mijn promotoren, collega's, collega-vrienden (wat moet een mens zonder haar multiplexe netwerkrelaties…), vrienden, en mijn familie.

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General introduction

> *What is a network? Well, you can say, knowing a lot of people. That could be a network. But when you know people who are all the same, you have a unilateral network, you see. Imagine for instance I only know plumbers, then I could know 2000 [of them], but they're all plumbers. Then you'd prefer I also know a few who are gardeners - so a little bit of everything, so to say. I think that would in the end form a good network. And in this project many companies are involved, so that's good. […] Then everybody's in there with a different view. That's very valuable. […] You have to have a network, or else you get that tunnel vision very quickly, so it's good to have many people together who are technically knowledgeable. That in case you come across problems, you can tackle them with the expertise of someone else. And that this reciprocity grows.*
>
> [PhD candidate, project MechEng2]

This PhD candidate touches upon the two concepts that are at the core of this dissertation: *networking* and *diversity*. Though he explains the relations between these concepts quite eloquently and straightforwardly, I will show in this dissertation that there is more to networking and diversity than '*having*' a network with people with '*a different view*'. I do so by exploring how people in practice work on their interpersonal networks, within the specific context of university-industry collaboration projects in the Dutch technology sector. In my quest to narrow down the main theoretical concepts of networking and diversity, link those to my empirical study, and make theoretical contributions, I have gone from mainstream network literature to critical management studies, to research on university-industry collaboration, to practice-based studies, to sociological power theories, iterating between this broad exploration of literature and the empirical material from several university-industry collaboration projects. This dissertation is the result of that quest.

The objective of this dissertation is to further develop the notion of networking as a practice. To do so, I build a theoretical framework that combines a practice approach and a critical diversity perspective. I apply this theoretical framework to the empirical study of six university-industry collaboration projects in the Dutch technology sector, in which functional diversity (science versus industry) is inherently present and a premise for a successful network. Additionally, and important for this dissertation, the gender balance in this sector is skewed. By further developing the notion of networking as a practice and applying a critical diversity perspective on networking practices, I contribute to the further development of network studies. Critically exploring the relationship building between people from different functional backgrounds and genders enables me to build a better understanding of **(1)** how organizational - in particular, university-industry - networks are built, maintained, and developed; **(2)** how

networking practices contribute to a diverse set of outcomes, i.e. the progress and performance of university-industry collaboration projects and inequalities among individuals; and **(3)** how diversity in networks encompasses complexities of power and structural inequalities.

Following, I will discuss the basic concepts and research approach of my research to build a framework for the study, and explicate the intended theoretical contributions. Next, I describe the research context. I then present my research questions, each of which is answered in one of the chapters. This is followed by an elaboration of the research design on which I have based the further development of the notion of networking as a practice. Finally, I present a short overview of the dissertation.

Point of departure: networking as a practice

This dissertation is centred around further developing the concept of networking as a social practice. As such I make a small step in further advancing network studies. This is relevant, as it is commonly acknowledged that networks play an increasingly important role in our present-day economy, for instance for jobseekers (Wanberg, Kanfer, & Banas, 2000), employees who want to climb the organizational hierarchy (m/f) (Brass, 1985), or for intra- and inter-organizational innovation (Valk & Gijsbers, 2010; Berkhout, et al., 2010; Dhanaraj & Parkhe, 2006; Lam, 2005; Swan, Bresnen, Newell & Robertson, 2007). Developing the notion of networking as a practice and applying a critical diversity perspective on networking practices as I aim to do, sheds a different light on the processes of those organizational networks and outcomes generated through people's networking practices.

Studies on organizational networks approach networks as a set of nodes or actors (i.e. persons or organizations) and the set of relationships between those nodes/actors (Brass, Galaskiewicz, Greve, & Wenpin, 2004). Studies often focus on the 'noun' of networks: structures of networks, positions of actors, and their ties to others. Network structures are seen as relatively stable, persistently patterned, repeated interactions among individuals (Brass & Burkhardt, 1993). The structural stream of research on all kinds of networks on the organizational and interpersonal level is well-developed and mature. This structural type of network research, however, downplays the role of individual actors in networks (Ibarra, Kilduff, & Tsai, 2005). It is widely recognized that the knowledge on what actors actually do within their networks, i.e. the agency in networks, is underdeveloped (Ahuja, Soda & Zaheer, 2012; Ibarra, et al, 2005; Kilduff & Brass, 2010; Kilduff & Tsai, 2003; Manning, 2010). Scholars acknowledge that although earlier network studies have been and continue to build up our understanding

of how networks work, we also need more 'agentic' accounts of networks that look at how actors' actions (re)produce networks (Ahuja, Soda, & Zaheer, 2012; Benschop, 2009; Manning, 2010; Kilduff & Brass, 2010; Kilduff & Tsai, 2003).

A stream of research exists that focuses on the verb instead of the noun of networks i.e. networking. From studies on networking I learn that people can build many different types of relations, such as friendship, advice, or support networks. These relations can be studied in isolation, or be studied together through the notion of 'multiplexity' of ties (the combination of multiple types of ties in one relationship, Phelps, Heidl, & Wadhwa, 2012). I also learn that networking can be studied for one actor (i.e. ego networks) or for a group of actors (i.e. whole group networks). Studies on networking try to bring order to the intricacies of inter-human relationship building by categorizing or isolating networking activities, of which the studies of Forret and Dougherty (2001; 2004) are good examples. To study the antecedents and consequences of people's networking, they developed and used a scale of what they called 'networking behaviors'. Yet, mirroring the shortcoming of structural network studies, these studies of networking are mostly focused on the micro level of networks and do not take macro structures into account (Ibarra et al., 2005). Additionally, categorizing behaviors in this way carries the risk of losing the intricacies of inter-human relationship building which, as I demonstrate in this dissertation, can provide interesting new knowledge on how organizational networks come about.

Despite earlier studies on networking, which were based for the large part on surveys and interviews, little theory is built on what actors actually do to build and develop their networks. To develop knowledge on this agency side of the network coin, we need to examine how actors actually act regarding their networks: what do people do when they build, maintain, and dissolve their network relationships? I follow Benschop (2009), Manning (2010) and Van den Brink and Benschop (2014) in suggesting to further develop the notion of networking as a practice to explore this question. I contend that a practice approach is able to provide in-depth knowledge of the agency in networks, and to thereby advance our understanding of organizational networks. The approach enables me to not only study this agency side of the network coin, but also the relation between this agency and structures. More than earlier studies on networking, a practice approach to networking is thus able to link micro activities and macro structures, as Ibarra et al. (2005) call for.

A practice approach to networking

The notion of networking as a practice was proposed by Benschop (2009), Manning (2010), and Van den Brink and Benschop (2014). This approach enables insights in micro-level activities of actors "that produce organizational

outcomes in local conditions" (Van den Brink & Benschop, 2014, p. 359). It stresses the socially accomplished and dynamic nature of networks (Benschop, 2009). The practice approach is well-suited to shine a light on the agentic side of networks as it examines what people actually say and do in their everyday work activities (Nicolini, Gherardi, & Yanow, 2003). It analyses routine and taken-for-granted activities and makes them centre-stage, with the goal to better understand how people learn their jobs and knowledge is built and transferred (Nicolini, Gherardi, & Yanow, 2003), how organizational routines work (Feldman, 2000), how strategy is designed and implemented (Whittington, 2006), or how gender is done and how gender inequalities are reproduced on the work floor (Poggio, 2006). Examining networking as a practice implies that one does not a priori determine which types of ties to in- or exclude in a study, but that one remains open to inductively observe how actors build relations with one another in a specific context. This provides room to see people's actual work interactions and how the nature of that networking is complex, messy, and multiplex (Phelps, Heidl, & Wadhwa, 2012).

Approaching networking as a practice implies that in the different chapters of this dissertation I identify and analyze 'networking practices', which I initially define as the "dynamic, socio-political actions of people when they enter, build, maintain, use, and exit their relations at work" (based on Benschop, 2009). This definition emphasizes my focus on the net-*work* (actions, activities) that people engage in when they build their relationships, the inherently social and political nature of networking, and the fact that networking (and thus networks) is not static but is subject to continuous development. Examples of networking practices discussed in this dissertation are socializing, keeping up visibility, network negotiation about the in- or exclusion of new partners, and tie hibernating, when ties remain dormant and inactivated due to people's inaction on their ties. I will adapt this definition of networking practices to its definitive form in the conclusion of chapter 2, based on the findings of that chapter.

What my study will show is that examining networking practices not only builds insight in the agency of network actors, but also in a variety of structures that impacts and is impacted by that agency. Through its notion of a social 'reality' that is constituted by social practices and its focus on actual network actions of people, the practice approach contributes to insight in how networks are not merely determined by individual choices, nor by structures – i.e. network structures or social system structures - alone. Rather, it is the continuous intertwinement of the two that constitutes networking. Different structures enable and constrain the agency people engage in regarding their networks, whereas that agency at the same reproduces or possibly challenges those structures. This continuous mutual relation between structure and agency of networking,

i.e. the agency-structure duality, is what constitutes organizational networks. This notion of the agency-structure duality in networks is inspired by Giddens' structuration theory (1979, 1984), which contends that one cannot exist - or be examined - without the other. Through the further development of networking as a practice, I am able to contribute to knowledge on how network agency and structures relate. In this dissertation structures are defined in two separate but related ways: structures in the sociological sense and in the network sense, i.e. network structures. Sociological structures that I discuss in the dissertation are the nets of organizational, cultural and professional practices that enable and constrain networking practices (chapter 2); the social systems in which people are embedded (chapter 3); and the gender order in society (chapter 4). Network structures are explicitly taken into account in chapter 5.

A critical diversity perspective on networking practices

It is my aim in this dissertation to advance our understanding of networking as a social practice. I do so by not only applying a practice approach to networking, but also by further developing a critical diversity perspective on networking practices, following Benschop (2009) and Van den Brink and Benschop (2014). In my research, networking practices in the context of university-industry collaborations are central. This is a context in which a variety of actors with different backgrounds – scientists, industry representatives, and funding agency officers - is required to build relationships with each other and (ideally) achieve the goal of innovation development. Diversity thus is a basic premise of these collaborations. An instrumental notion of diversity would suggest that this diversity is productive and constructive for the innovation development of these collaborations. I contend that this is a fairly positive view on diversity that overlooks potentially problematic power processes and inequalities. I propose to take a more critical perspective on diversity: for this purpose, I study networking practices through a critical diversity perspective (CDP) (Zanoni, Janssens, Benschop, & Nkomo, 2010). This stream of research is a response to diversity research that takes a predominantly instrumental, positive, business case perspective on diversity. I will now first explain what a critical diversity perspective is, and then link it to networking as a practice.

Critical diversity perspective

Instrumental accounts of diversity work under the assumption of the business case of diversity. They approach diversity as a multifaceted concept that affects individual, group and organizational outcomes (Lau & Murnighan, 1998). It is, for instance, commonly stated that diversity breeds innovation (Cox and Blake,

1991; Van Knippenberg, De Dreu & Homan, 2004), as a multitude of different perspectives brought together can enhance creativity and the development of innovative ideas and products (Danilda & Thorslund, 2011; Østergaard, Timmermans, & Kristinsson, 2011; Pittaway, Robertson, Munir, Denyer, & Neely, 2004; Williams & O'Reilly, 1998). It is assumed that "diverse groups have access to a larger pool of resources—ideas, opinions, perspectives and values—when performing tasks, resulting in a broader range of task-related knowledge, abilities and skills than homogeneous ones […], leading to better performance and creative ideas and solutions" (Zanoni et al., 2010, p. 13).

A sole focus on the business case of diversity, however, does not take into account the power relations and inequalities that exist between people based on their different social identities, nor how their behaviors reinforce or challenge those inequalities. Inequalities are disparities between participants related to power and control over resources and outcomes, opportunities for interesting work and promotion, monetary rewards, respect and status (Acker, 2006). The critical diversity perspective focuses on these aspects of power and structural inequalities related to diversity.

As such, the critical diversity perspective forms part of the larger stream of critical management studies (CMS). CMS questions 'mainstream' management research, seeing this type of organizational studies as being too invested in managerial interests and covering up voices of minorities and power processes. CMS scholars aim to "unmask the power relations around which social and organizational life are woven" (Fournier & Grey, 2000, p. 19). In so doing, they aim to achieve emancipation and social change (Spicer, Alvesson, & Kärreman, 2009). These scholars question the dominantly positivistic research approach to diversity that leans heavily on social psychology. This ignores the role of organizational and societal context impacting diversity, and explains discrimination and power acts as an individual choice rather than a result of "historically determined, structurally unequal access to and distribution of resources between socio-demographic groups" (Zanoni et al., 2010, p. 14).

Critical diversity scholars uncover how the 'organization of organizations' and people's behaviour within organizations contribute to organizational inequalities and how diversities and identities are socially accomplished. They examine diversity "within existing intersecting power structures and relations" (Metcalfe & Woodhams, 2008, p. 379). Since the 1990's, different streams of critical diversity research have emerged to uncover inequalities and power structures, among which discourse studies of identity construction and diversity studies through a critical sociological lens. I position my study in the latter, to link networking practices on the interpersonal network level with inequalities based on gender and functional diversity.

Critical diversity perspective, power, and networking practices

From earlier structural network studies I learn that networks inherently contain inequality and power. Power is related to network aspects such as an actor's central or broker position in networks, network size, or closeness to certain others (Brass, et al., 2004). Also, inequalities in networks that are based on gender are documented through structural network studies (e.g. Brass, 1985; Ibarra, 1992; Cox & Nkomo, 1990; Ibarra, 1995; Mehra et al., 1998). This type of network study shows for instance how men and women have and need different networks which either help them or restrict them in advancing within an organization. These former studies suggest that one's position in a network or network as a whole provides power resources and advantages to some but disadvantages to others. Inequalities and power are thus inherently present in organizational networks.

Less attention is given in network literature to the processes of power and how inequalities and (dis)advantages for certain parties or actors come about in organizational networks. Little knowledge is developed on how inequalities come about through people's networking practices (Benschop, 2009). Benschop (2009) and Van den Brink and Benschop (2014) therefore aimed to further develop this knowledge by introducing a critical diversity perspective to the study of networking practices. Both studies focused on gender inequalities. Benschop (2009) explored how account managers practice gender through their networking practices. Van den Brink and Benschop (2014) examined how academic gatekeepers practice gender when scouting for professorial candidates. From their studies I learn that networking and gender are inextricably intertwined. Seemingly 'neutral' networking practices such as inviting others, asking recommendations, or networking with superiors may in fact work to perpetuate gendered stereotypes and (re)produce inequalities, often to the disadvantage of women.

To advance the knowledge on how networking practices are power-laden and bring about inequalities, I apply and further develop this critical diversity perspective on networking practices in this dissertation. I do not directly relate the group composition of the project networks to the outcomes of these collaborations as a mainstream account of diversity would likely do. Rather, I explore how the diverse actors in university-industry collaborations build relationships with each other to gain a better understanding of the power processes that shape and are shaped by their networking practices and the resulting networks, inequalities, and course of the projects.

In my research I examine two 'types' of diversity related to networking practices in university-industry collaborations. The first is functional diversity, which is based on differences in functional and educational background (Van Knippenberg et al., 2004). In this research, functional diversity relates to the

different backgrounds of actors in university-industry collaborations: scientists, industry representatives, and funding agency officers. Studies taking a Critical Diversity Perspective often focus on social identities such as gender and ethnicity in relation to power dynamics, yet functional diversity is less explored in this type of studies. In my research I explore how diverse actors build relationships with each other, how their backgrounds and structures in which they are embedded inform and are shaped by their networking practices, how power is involved in those practices, and how inequalities between these actors come about – or are perhaps changed - through their networking practices. This type of diversity is central in chapters 2, 3 and 5.

Besides the functional diversity in university-industry collaboration projects, I study how gender plays out in the networking practices between the actors in these projects. The reason for this choice is twofold: first, it is often said that gender is one of the fundamental organizing principles (Alvesson & Billing, 2009), which means that the division of labour and the experiences of employees and managers are fundamentally shaped by gender. Second, it is clear that gender bears particular relevance in a field that centers on technological innovation. The men-domination of science and technological occupations is well documented, as is the fact that technology is still for a large part associated with masculinity and a 'masculine' realm or fraternity (Faulkner, 2001; Kelan, 2007). This creates an environment in which women are underrepresented, with a culture that can exclude or marginalize women's participation. I therefore explore how the men and women involved in the university-industry collaborations engage in networking practices to build relationships with one another and how their networking practices are simultaneously impacted by and have an impact on the gender inequalities in the field and of the collaborations. Gender is central in chapter 4.

Research context: university-industry collaborations

> *They are, in fact, two different worlds that, at the same time, need each other.*
>
> [Assistant professor, project MediPro]

I develop the notion of networking as a practice through a study within a field in which networking and diversity are both important, if not crucial, elements: university-industry collaborations in the (Dutch) technology sector.

Worldwide consensus is growing that publicly funded science must be linked more closely to the needs of society (MacLean, Anderson, & Martin, 1998). As a result, an increasingly important concern for governments and policy makers

is the stimulation of university research that is congruent with industrial needs and the promotion of the involvement of industrial partners in academic research projects (Lundequist & Waxell, 2010; Perkmann & Walsh 2007). Collaboration between science and industry is commonly seen as a key driver for innovation, the development of a knowledge economy, and long-term economic growth (Lundequist & Waxell, 2010). Increasing this interaction implies that university systems need to internalize the interests of industrial sectors. Entrepreneurialism and societal accountability are becoming increasingly relevant aspects of academia, besides the traditional peer evaluation and recognition (Benner & Sandström, 2000).

Within university-industry collaboration projects, the ideal situation is when university scientists and industrial partners build relationships to use the synergy of their diverging backgrounds and perspectives for the development of innovative knowledge, tools or products. The basic notion of these projects is that diversity brings about innovation by bringing together fundamental (scientific) and practical knowledge. Seen from an instrumental diversity view, the premise of university-industry collaborations is that functional diversity - multiple stakeholders that have a scientific or an industry background - is needed to create synergy, lead to innovation development, and generate value for both science and business/society. For this purpose, interpersonal relations between university scientists and industry representatives are deemed essential (Bruneel, D'Este, & Salter, 2010; Gertner et al., 2011; Meyer-Krahmer & Schmoch, 1998; Swan, Scarbrough, & Robertson, 2003). Studies have shown that interactions between university and industry can, however, be inhibited by barriers. These are lack of mutual understanding due to differences in language and educative background (Niedergassel & Leker, 2011); orientation-related barriers regarding goals, topics or time-orientation and Intellectual Property-related barriers, such as disagreement over forms of disclosure of results (Bruneel, D'Este, & Salter, 2010; Hall, Link, & Scott, 2001; Meyer-Krahmer & Schmoch, 1998); and culture clashes, bureaucratic inflexibility, poorly designed reward systems on the side of universities, and ineffective management of Technology Transfer Offices as barriers to effective collaboration (Siegel, Waldman, Atwater, & Link, 2003).

This context – the basic premise of diversity and the inhibiting factors that go with it - provides interesting material to study the networking practices of the involved actors from a critical diversity perspective. Research up to now has given relatively little attention to 'non-codified' knowledge channels such as university-industry projects (Gernter et al., 2011), or to social processes of networking in the context of innovation (Pittaway et al., 2004; Swan et al, 2003). This study, by providing a peek into the actual activities of university-industry project participants, builds knowledge on these topics. Studying what happens

in the networks at the micro-level of university-industry collaborations through a practice approach and a critical diversity perspective adds to knowledge on how different kinds of diversity play out in the networking between scientists and industry representatives in those collaborations.

Research questions

In short, the objective of this dissertation is to further develop the notion of networking as a practice, with the use of the practice approach and the critical diversity perspective. To achieve this aim, I answer four research questions.

The first question is, *how is networking a social practice?* This question is central in chapter 2. I build and illustrate a conceptual social practice framework to study networking. I use this framework to show that networking is not an activity that stands on its own (agency), but that it is embedded in and impacts a net of other practices (structures) and is related to actors' identities. I use this conceptualization of networking as a practice as a basis for the studies in the rest of the dissertation.

I then argue that as scientists, industry representatives and funding agency program officers come from different social systems and have different goals and interests, their networking practices are bound to be political. In chapter 3 I therefore ask, *how are networking practices in university-industry collaborations works of power?* In this chapter the functional diversity of the scientists and industry representatives is central. I examine how the structures of their social systems enable and constrain the networking practices of the diverse actors and how this informs the political dimension of networking practices.

As the collaboration projects have unbalanced gender ratios, chapter 4 answers the question, *how are networking practices in university-industry collaborations gendered?* The chapter explores how gender is sometimes practiced in networking practices, drawing from culturally available gender practices, and thereby either reproducing or destabilizing gender inequalities in the technology sector.

In chapter 5 I explore how networking practices contribute to network dynamics. To do so I relate the networking practices in which the project participants engage to the structures of their networks and ask, *how do networking practices change or stabilize interpersonal network structures and how those network structures enable or constrain those networking practices?* In this chapter I examine network structures, whereas in earlier chapters I referred to structures from a different sociological framework. Functional diversity is centre-stage again. I explore how networking practices between the scientists, industry representatives, and program officers are informed by and contribute

to structural changes and continuities of the project network structures as well as to the progress and outcomes of the projects, providing benefits to some and disadvantages to others.

Societal relevance

Further developing knowledge on networking as a practice as I do in this dissertation does not only have theoretical implications: advancing the notion of networking as a social practice, and providing a critical lens on networking and networks has value for society as well. In our society the importance of phenomena such as inter-organizational networks of production, co-creation, innovation, diversity, and interdisciplinary science is increasing. If we want to understand how networks and diversity actually come about and play out in practice, and how they have both positive and detrimental effects on networks, it is important to understand what happens in actual situations where people need to deal with these phenomena. We need to know how people in those situations build bridges between one another, what opportunities and challenges they meet along the way, how they produce or challenge inequalities, so that situations in which networks and diversity are important, if not essential, for success, can be better understood and inequalities that are detrimental for certain (groups of) individuals can be challenged. This dissertation makes a step in building this understanding, through my study within the specific context of technological university-industry collaborations.

Additionally, the relevance of the research links to the particular notion of 'science for society' that is more and more the basis for policies on scientific research (Lundequist & Waxell, 2010; Perkmann & Walsh 2007; MacLean et al., 1998). How can policies and organizations such as the funding agency in my study, but also scientific institutes and industry, facilitate the 'valorization' of science? Funding agencies are key distributors of public research money (Lepori et al., 2007); what can they learn from this study to better facilitate and support university-industry networking? How can those institutions challenge inequalities that are caused by their own procedures and behaviors and those of others? Looking at what actually happens in the university-industry collaboration projects under study contributes to insights on how policy can best be set up, not only to reap the fruits of public-private collaborations, but also to ensure that these collaborations do not lead to detrimental inequalities between participants in whichever way. In the discussion of this dissertation, I develop practical implications and recommendations in which I discuss what insights the study has brought that are relevant to these societal phenomena.

Methodological approach

To give an overview of the empirical research I conducted, I now shortly go into the research strategy, cases, methodology, and analysis of the collected empirical material. Extended explanations of the collection and analysis of the empirical material are particular for each chapter and can therefore be found in each separate chapter.

Research strategy

For my research I collected empirical material through multiple case studies (Eisenhardt, 1989). The cases were six university-industry collaboration projects in the technology field in the Netherlands, facilitated by a government-based funding agency. Case studies are appropriate for analyzing complex and little understood phenomena (Manning, 2010) and focus on understanding the dynamics present within single settings (Eisenhardt, 1989). This is suitable for my research as it is explorative. As case studies provide in-depth accounts of complex phenomena, it is particularly well-suited for explorative studies and theory development: "Theory building seems to require rich description, the richness that comes from anecdote" (Mintzberg, 1979, p. 587). Iterating between the findings from my empirical study in the university-industry collaboration projects and the theoretical framework as elaborated earlier, allows me to develop a critically-oriented practice-based theory of networking.

Moreover, the case study design is appropriate because of the practice approach that is central in this dissertation. As the practice approach examines the actual sayings and doings of people within their work environment, neither a mere quantitative nor an interview research strategy would suffice to build an understanding of how networking is done between people. To study networking practices, as practice research in general, one needs detailed observations of practical accomplishments (Nicolini et al., 2003). To get an integral picture of the networks and networking practices in the cases, one needs to observe in real time and space how people build relations with one another, over a prolonged amount of time. A case study design provides the opportunity to do so. I will elaborate on the specifics of the methodology concerning the practice approach in chapter 2.

Practice studies are necessarily limited in scope as they zoom in on the nitty-gritty of an empirical phenomenon to gain new theoretical insights on social 'reality' (Nicolini, 2009). I realize that keeping the study within six collaboration projects of one particular funding agency may seem to have its restrictions: the possibility of generalizing the empirical findings to other agencies or university-industry projects is limited. However, the aim of my study and practice studies in general is not to generalize findings, but

theoretical generalization. This involves "generalizing from a study to a theory. Rather than asking what a study tells us about the wider population (statistical generalization) we ask 'What does this case tell us about a specific theory or theoretical proposition?' [Case studies] are designed to help develop, refine and test theories" (De Vaus, 2001, p. 237).

Cases

The research was conducted within the framework of a Dutch technology funding agency that facilitates collaboration projects between universities and businesses and other organizations - called "users" by the funding agency. In this dissertation I refer to them as industry representatives. Through its funding policies and requirements the agency provides the opportunity to bring these stakeholders together in projects, and stimulates cross-fertilization through the exchange of knowledge, information, money, and materials. This method of working creates the possibility that potential users of new (scientific) technological knowledge are involved in the development of this knowledge, to enhance the value of science for technology practice and for society. The funding agency has clear standards for what they consider successful innovation projects: successful projects do not only have scientific, but also technological (e.g. a product), and monetary revenues.

I studied six real-time cases that formed the basis of this dissertation (table 1.1). These cases were not randomly selected, but through theoretical sampling, which means that the cases were selected for theoretical, not statistical, reasons (Eisenhardt, 1989). This theoretical sampling implies that for the selection of the research cases several factors based on the concepts and relations under study were taken into account. Criteria for the inclusion of the cases were the recent establishment of the projects (i.e. after 2009) and the number of women in the networks. I chose these cases as I needed cases that could be followed for two years, without them finishing half-way, and cases with women participants as gender was one of the elements of diversity I aimed to examine.

Collection of empirical material

A case study design gives room for method and findings triangulation. In my research I used multiple data collection methods, both qualitative and quantitative, for the triangulation of empirical material: observations, interviews, document analysis, and a survey. In so doing, the particular strengths of these collection methods were drawn upon and the gathered material and analyses complemented each other (Eisenhardt, 1989) and formed the basis for comprehensively studying the networking practices within the projects.

The empirical material within the collaboration projects was collected from

September 2011 to January 2014. I started my data collection within each project with studying its project application and - if already existing - minutes of earlier meetings. I also did a first observation of a project meeting, to introduce myself and get a better picture of the respective projects and participants at hand. I then proceeded with interviewing participants that I identified as representing the diverse parties in the projects: project leaders, fellow project applicants (professors), executive researchers (i.e. PhD students or postdoctoral fellows), funding agency's program officers, and multiple industrial representatives. The following two years, I visited project meetings (every six months – it differed per project whether they actually happened with that frequency) and studied documents such as meeting minutes, presentations, and progress reports (for most projects I was added to the mailing list). I finished the collection of material with a survey, so as to be able to measure the networks at the end of the two-year period and quantitatively establish the outcomes of the projects. I will now shortly elaborate on each of the methods I used.

Observations are essential to understanding what people actually say and do in their (net)work activities (Gherardi, 2012; Nicolini, Gherardi, & Yanow, 2003), give the researcher access to group processes, and reveal discrepancies between what people say and what they do (Pettigrew, 1990). The funding agency requires that the researchers and industry representatives involved in the collaboration projects come together every six months to discuss the progress of the project and decide upon further actions. These meetings are the main vehicles through which the funding agency aims to steer the collaborations between researchers and users and were therefore essential to my data collection. Networking practices have scarcely been studied through observations, which rendered this part of the research explorative. It was decided in consultation with the facilitating funding agency to not make recordings of the meetings due to confidentiality issues, but to make records of them via detailed field notes. I acted as a bystander and did not actively participate in the meetings, though I was often included in the closing round of questions and I was sometimes directly addressed during the meetings. My presence as young researcher, from a non-technological discipline, and a woman in a mostly male-dominated environment set me apart and made me visible (which led for instance to several gendered situations, see chapter 4), but at the same time made me an outsider, which enabled me to observe and use that position to inquire for information. See Appendix B for the initial observation guide. Due to the nature of practice research, I mostly worked inductively when exploring the networking practices of the project members. This means the observations were written up in field notes, typed out in a word-processing program, and then inductively analysed for networking actions.

Table 1.1 Overview cases dissertation

Name project	Field	Participants*	# women**	Used inchapter
MechEng1	Mechanical Engineering	· Project leader · 3 Fellow project applicants · 3 Executive researchers · 5 Industry representatives · Other · Program officer · Management Assistant	1 woman	2,4,5
MechEng2	Mechanical Engineering	· Project leader · 3 Fellow project applicants · 2 Executive researchers · 9 Industry representatives · Program officer · Management Assistant	1 woman	4,5
MechEng3	Mechanical Engineering	· Project leader · 4 Fellow project applicants · 2 Executive researchers · 6 Industry representatives · Other · Program officer · Management Assistant	1 woman	4,5
MediPro	Medical technology	· Project leader · 3 Fellow project applicants · 3 Executive researchers · 6 Industry representatives · 5 Others · Program officer · Management Assistant	7 women	2,3,4,5
CivEng1	Civil Engineering	· Project leader · 2 Fellow project applicants · 4 Executive researchers · 12Industry representatives · Other · Program officer · Management Assistant	2 women	4,5
CivEng2	Civil Engineering	· Project leader · 2 Fellow project applicants · 3 Executive researchers · 15 Industry representatives · 2 Others · Program officer · Management Assistant	2 women	4,5

* *Based on most updated participant lists used for the survey in January 2014.*

** *Leaving out the management assistants, who were all women.*

*** *The number of observations between the first and the other chapters differ, as the first chapter is the only chapter that was not (re)written after the collection of empirical material had finished and hence new materials were not brought in, though the analyses of the existant materials in that chapter were sharpened along the process.*

Through *interviews* I examined the perceptions of project participants related to their project's establishment and goals, its progress, their networking practices, other network members, and diversity. See Appendix A of this dissertation for a full interview guide. Additionally, the interviews were used to measure the project network structures through posing relationship questions (e.g. Ibarra, 1997). Surveying the network through interviews facilitated the control of the participation of respondents and the posing of further questions for clarification and deeper understanding. In so doing, I was able to gain the confidence and trust of the respondents. The interviews were transcribed verbatim for the analyses. These interviews enabled me to grasp what happened network-wise outside of the observations I made of the general project meetings.

I did not only conduct interviews and observations, but also studied all available *documents* for each collaboration project, from the first project application paper to the last available minutes of meetings, to gain a complete picture of the cases and poject networks at hand. The procedures and policies of the funding agency were examined to understand the formal procedures of the projects. I was also a member of the mailinglist of several projects, which gave additional insight in how the agency worked and the projects proceeded.

Finally, I set up *a survey* and distributed it among all project participants. I did so with two purposes. First, I needed to map the network structures at the end of the data collection period, so as to compare these network structures to the network structures two years earlier and determine the stabilities and changes in the networks. A survey is a common method for measuring social networks, providing room to gain either ego- or socio-metric network data, or both, as I have done in this study (following Reagans & McEvily, 2003). This network analysis was part of the study reported in chapter 5 on network dynamics. It also helped me to gain insight in what happened network-wise outside of the observed meetings, like the interviews. Second, I conducted this survey to gain insight in the perceptions of the project participants concerning the progress and outcomes of the projects. See Appendix C for the set-up and the survey.

General data analysis

The papers on which the chapters are based, had their own idiosyncratic data analysis processes, but they also had several analytical steps in common. The analyses are in line with practice-based studies (e.g. Nicolini, 2009; Gherardi, 2009).

After it was established what the focus and research question were of the respective chapter on the basis of the general research objective, a review of literature and/or the exploration of the collected empirical material, I would code each data source (observations, interviews, documents) by hand or with

the help of Atlas-ti software to gain an in-depth and detailed insight of what was going on networking-wise in the projects under study (see table 1.1 for an overview of which projects were used for which chapters). In the coding of the observations I focused not only on discursive activities in the interviews and in the field notes, i.e. *what* was being said to whom, but on bodily and material activities (Gherardi, 2009) as well, e.g. laughing, using IT for presentations, where people went to sit as well, as those activities could also provide clues regarding the building of relationships between the project participants. This coding process was open and gave me insight in people's networking activities within, their perceptions of, and the organizational context of the projects. For chapter 3 and 5 on power and network dynamics respectively, I then built case (re)constructions (Levy, 2003) of the projects under study to gain a chronological understanding of the respective projects.

The next step, informed by the particular research question of each chapter, was to find patterns of activities in the data, which meant looking for and interpreting activities that contributed to the building and development of relationships between persons, i.e. networking practices. I did so by iterating between the different data sources, which then led me to identify several networking practices in each chapter. As the different chapters will show, many different practices were found, which is one of the points I want to make in this dissertation: networks are not the result of merely one or two forms of tie building (e.g. friendship and advice), but are the result of many different, simultaneous small-scale actions of people within the framework of the networks in which they are embedded.

In line with Nicolini (2009)'s analyses of telemedicine, I then wrote out excerpts for each networking practice to illustrate the practice, enable in-depth analysis, and give the reader a sense of how the practice was enacted in a real-time situation. I composed these excerpts by writing out the field notes and the interview quotes. For the subsequent in-depth analyses I then used sensitizing questions, derived from the research question and theoretical framework of the respective chapter to interpret the excerpts and build a deeper understanding of the networking practice. I thus 'asked questions to the material' - e.g. "what resources, i.e. information, goods/materials, money, time, position or relations do the participants seek to gain through this networking practice?" (from chapter 3 on power). I did so to link the empirical results with wider literature (Eisenhardt, 1989; Pettigrew, 1990). This stage of the analyses was abductive, meaning I went back and forth between the empirical material and the literature to make sense of the material and make theoretical contributions (Yanow, 2006; Van Maanen, Sørensen, & Mitchell, 2007). Through discussions and feedback from my supervisors and external reviewers (e.g. conferences,

seminars, journals) I then deepened and sharpened the analysis, and came to a rounded story for each chapter's analysis, that was able to provide new insights into the networking practices in the different university-industry collaboration projects and enabled me to make theoretically relevant contributions.

Structure of the dissertation

This dissertation consists of four main chapters. In each of these chapters, the practice approach and a critical diversity perspective to study networking practices are applied, yet each time from a different angle.

The goal of chapter 2, *"Networking as a practice"* is to develop and illustrate a practice-based approach towards studying networking. I build my theoretical framework for the study of networking practices of the diverse actors in the university-industry collaboration projects and discuss the networking practices in MediPro and MechEng1. I use this approach to study networking practices in the subsequent chapters.

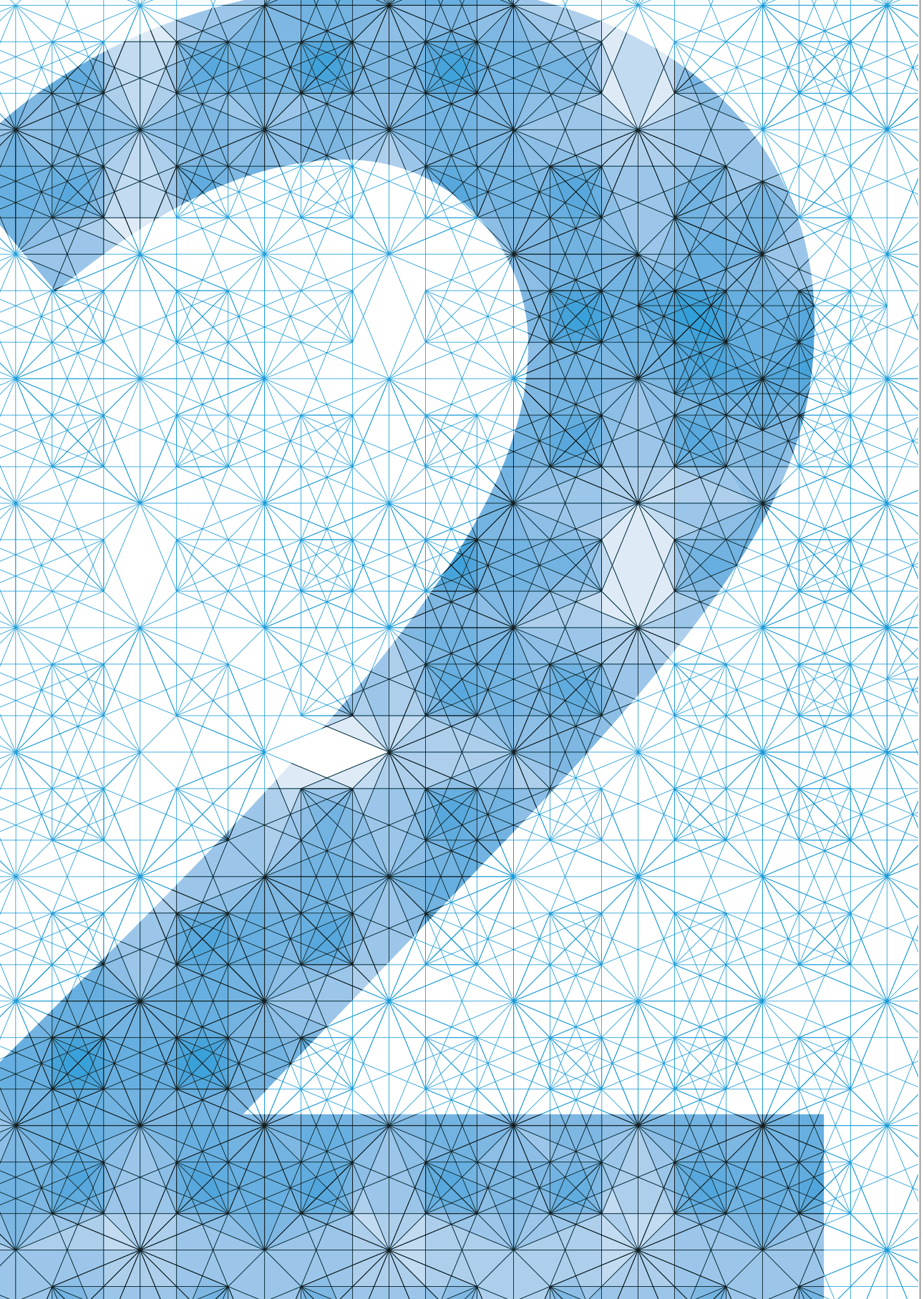
In chapter 3, *"Networking practices as works of power in university-industry collaboration"* I use the combined practice and critical diversity approach to examine how the networking practices between scientists and industry representatives are "works of power", or in other words, how are they power-laden? I zoom in on MediPro, the project in the medical (engineering) sector, to explore how diverse project participants build relations with one another to gain or use influence to get things done within the project. This analysis examines and demonstrates how networking practices intertwines with the enactment of power between people.

In chapter 4, *"Practicing gender when networking: the case of university-industry innovation projects"* I further build on the combined practice and critical diversity approach, now from a gender perspective. The chapter gains insight in the role of gender in interpersonal networks by exploring the concept of "practicing gender" (P. Y. Martin, 2003), the momentary accomplishment of gender when people build, maintain and exit social networks. The analysis is based on all six cases and demonstrates how people in real time and space draw from culturally available gender practices in their networking practices with each other. They build relationships in such a way that they reproduce and sometimes counter stereotypes of femininity and masculinity, and thereby confirm or challenge gender inequalities and the masculine culture of technology.

In chapter 5, *"Negotiating networks and transferring ties: an examination of how practices of networking propel network dynamics"* I examine how the networking practices of the project participants contribute to changes or continuities in the network structures of the university-industry collaboration projects. I conduct

a longitudinal study of all six cases, combining qualitative data of networking practices with a quantitative study of network structures. With this chapter I show that examining networking practices will bring us more insight in the continuous intertwinement of networking practices and network structures which informs network dynamics, the relation between interpersonal and inter-organizational network ties, the political dimension of network dynamics, and the link between networking practices and outcomes of the project networks.

In closing chapter 6 I then bring these chapters together and build a critically-oriented practice-based theory of networking. I discuss the contribution and theoretical implications for network(ing) studies. Additionally, I reflect on the research design and execution and make suggestions for research to further develop the findings from this dissertation. Finally, I elaborate on several practical considerations, and end with concluding remarks. All in all, the dissertation will shed a critical light, grounded in practice, on how a diversity of people in an organizational context "work the net" with one another, providing insight in the work that goes into the ties that make up their networks.



Networking as a practice*

* *An earlier version of this chapter was presented as a paper at the 2012 Meeting of the Academy of Management, Boston, USA, in the stream 'Networks and Networking' of the OMT Division (Berger, Benschop, & Van den Brink, 2012a).*

Abstract

The objective of this chapter is to take the first step in explicating and developing a practice-based approach to networking. To study the notion of networking as a social practice follows the call for building more knowledge on the agency side of networks (Van den Brink & Benschop, 2014; Ahuja, Soda & Zaheer, 2012; Ibarra, Kilduff, & Tsai 2005; Kilduff & Brass, 2010; Benschop, 2009; Kilduff & Tsai, 2003; Manning, 2010). Development of this knowledge is relevant to better understand how networks are basically patterns of interactions between people (Jolink & Dankbaar, 2010), and thus are fundamentally social and dynamic accomplishments (Benschop, 2009). To further develop the notion of networking as a practice, we conducted a qualitative case study of two Dutch university-industry collaboration projects in medical technology and in mechanical engineering. In these cases we see how scientists, industrial representatives, and funding agency officers engage in networking practices with each other. Studying their networking practices, we are able to identify and examine how these practices are enabled and constrained by their professional identities and 'practice-nets', i.e. circumjacent organizational, professional, and cultural practices. This hints at how the agency of people in their networks cannot be studied without taking structural aspects, in the sociological sense, into account. The chapter shows that the practice approach can provide a rich and fruitful framework to shed a light on social networks as socially accomplished entities. As such, it forms a good introduction into the notion of networking as a practice as a foundation for the rest of the dissertation.

Keywords: *networking; networks; practice approach; networking practices; university-industry collaboration*

> *Networking, […] the building up of contacts and to use those for questions you have or products you have, to disseminate those through contacts, or to get other contacts via those contacts. To lobby, to share problems, or to get questions answered, get information from competitors or [on] developments, through all sorts of channels – might be colleagues, might be university, suppliers – to get that accomplished.*
>
> [Industry representative, project MechEng1]

> *You have to have a common goal, something everyone's interested in. But the oil is human contact…Technology is fun, but it is the people who make it stay fun, who make sure things happen or not…you need human contact so people allow each other things and do or arrange things for you…that willing power grows as you get better contact…If that's not right, you're like, who is that, where does he come from? So that's important: both the technical and the human aspect.*
>
> [Industry representative, project MechEng1]

What is networking in practice? That is the central question in this chapter. These two industry representatives from project MechEng1 hold complementary views on what networking entails. The first industry representative gives a concrete description of how networking can be done for many different goals and between many different actors. The second representative indicates how networking in the context of university-industry collaboration is (ideally) steered by a common goal and how networking is more than merely 'technical'; it entails both instrumental and social value. Both representatives point to how networking is a doing, how it consists of activities. In this chapter, we explore this idea of networking as a doing by developing the notion of networking as a social practice and examining in-depth how networking is done in organizational practice.

Introduction

Networking is of central importance in organizational life. In a world where relationships, both interpersonal and inter-organizational, are more and more central, networks are observed to be key for job finding (Wanberg, Kanfer, & Banas, 2000), building careers and work performance (e.g. Emmerik et al., 2006; Forret & Dougherty, 2001, 2004), ascent to top positions (Brass, 1985), managerial accomplishments (e.g. Michael & Yukl, 1993), or the development of innovation (e.g. Valk & Gijsbers, 2010). For the latter, it is often acknowledged that inter-organizational networking is becoming increasingly important (Berkhout, et al., 2010; Dhanaraj & Parkhe, 2006; Lam, 2005; Swan, Bresnen,

Newell & Robertson, 2007).

Research into organizational networks often focuses on the networks and positions of actors in a network, or the structures of whole networks, applied to many different contexts and on different levels. The power of this structural approach is that it takes a helicopter view on social and organizational relationships (see inter alia Wasserman & Faust, 1994). In so doing, it produces valuable knowledge on the myriad of social relations of actors (e.g. their ego-networks), relations within groups, and relations between groups of actors - whether individuals or organizations - thereby providing many insights into social and organizational phenomena (e.g. Ibarra, 1992; Kijkuit & Van den Ende, 2010).

We contend in this chapter that a network – both interpersonal and inter-organizational – on the basic level is constituted by people's actions, and thus is inherently socially accomplished. Whereas networking has been studied before, mostly through a structural lens (e.g. Tonge, 2008; Nebus, 2006; Forret & Dougerty 2004, 2001), little theoretical knowledge exists about how (organizational) networks are actually accomplished by individuals. An agency perspective to networks is rarely applied in the network literature (Ahuja, Soda & Zaheer, 2012; Ibarra, Kilduff, & Tsai 2005; Kilduff & Brass, 2010; Kilduff & Tsai, 2003; Manning, 2010). Consequently, we know little of what people actually do when they build and maintain their networks (Benschop, 2009).

To contribute to knowledge on this agency side of the network coin, the objective of this chapter is to explicate and develop a practice-based approach to studying networking. For now, we define networking as "dynamic, socio-political actions of people when they enter, build, maintain, use, and exit their relations at work", based on Benschop (2009). In the conclusion we adapt this definition of networking practices to its definitive form, to be used in the remainder of the dissertation. We contend that networking is a social practice that is accomplished through interactions between individuals. This implies that it can be observed in everyday activities, which is a central notion in the practice approach (Nicolini, Gherardi, & Yanow, 2003). By examining networks through the micro lens provided by the practice approach, we are able to study the building and development of networks "in the heat of the moment". This gives us the opportunity to better understand and gain in-depth insight of what happens at the basis of (inter)organizational networks. It is a way to gain insight into how organizational actors - in this dissertation specifically university scientists, industrial representatives and funding agency officers - manage their networks with one another. This provides a better understanding of how organizational networks are built, maintained, and developed.

In this chapter we zoom in on the agency of people within their networks to

build an understanding of the social accomplishments that networks are. The chapter will illustrate the notion of networking as a social practice through a study of two university-industry collaboration projects. These projects are well-suited for studying networking, as specifically in university-industry interactions (informal) tie building is an important practice (Perkmann & Walsh, 2007). We conducted a case study (with the use of observations, interviews, and document analysis) of MediPro, a collaboration project in the medical technology sector, and of MechEng1, a collaboration project in mechanical engineering. We used the functional diversity in the projects to study the networking practices done in the projects, in line with our critical diversity perspective (see chapter 1). We discuss for each party we identified in these projects – university scientists, industry representatives, and funding agency's program officers – in what networking practices they engaged. This allows us to demonstrate and put an emphasis on the 'work' in networks. The combination of the theoretical concept of 'practices' and our empirical exploration enables the further development of the notion of networking as a social practice. This helps to contribute to our knowledge on networks and on university-industry collaborations. In the following section, we discuss the theoretical background that serves as the framework for developing the notion of networking as a practice. We identify an area of interest in network research that is in need of further development – agency in networks - explicate what the practice approach is, and explain why this approach is appropriate to contribute to that area of interest in network research. After an elaboration of the applied methodology, we continue with a series of illustrations of networking as a practice. We took these illustrations from our observations and interviews within the two cases of university-industry collaborations projects. The analyses of these illustrations demonstrate the role of identity and practice-nets in networking practices. The discussion section further elaborates the contributions of the approach, and discusses the relation of this chapter to the other chapters.

Theoretical background

Agency in social network analysis

Social network research approaches networks as structures that can be statistically reconstructed and visualized in network sociograms, depicting networks in the same way photographs depict moments in life. One can uncover the structural dimension of social and organizational life through, for instance, the analysis of weak ties (Granovetter, 1973), structural holes (Burt, 2004), cliques, brokers or bridges (Scott, 2000; Wasserman & Faust, 1994).

Networks are usually approached as a context of action for actors, constraining and facilitating their behaviours (Borgatti & Foster, 2003; Kilduff & Brass, 2010). Though this depiction of reality has many advantages, it does not take into account that people's identities, agency and environment impact on the structure and outcomes of their networks: "networks are subjective structures that are inseparable from their social context and the activities of social actors" (Jones, Conway, & Steward, 2001, p. 21). Networks are socially accomplished as they are the result of actors net'*working*'. Networks ultimately consist of the relationships between people, which implies it is people's relational actions that influence and are influenced by their networks (Ibarra, et al., 2005).

Earlier studies have focused on networking as a range of activities. They speak of tie formation (Elfring & Hulsink, 2007; Farh, Bartol, Shapiro & Shin, 2010; Nebus, 2006), boundary activities (Drach-Zahavy & Somech, 2010), or networking behaviour (Forret & Dougherty, 2001, 2004; Jolink & Dankbaar, 2010; Michael & Yukl, 1993; Singh, Vinnicombe & Kumra, 2006). Some articles do not specify what kinds of activities they have in mind when investigating it (Gould & Penley, 1984; Jolink & Dankbaar, 2010; Tonge, 2008). Other accounts speak only of networking activities such as selection, adding, or removal of ties (Elfring & Hulsink, 2007; Koka, Madhavan & Prescott, 2006; Nebus, 2006) or forming coalitions, negotiating and maintaining contacts (Forret & Dougherty, 2001; Manning, 2010; Stevenson & Greenberg, 2000; Van den Brink, 2010).

The focus of many of these former studies is on the ego network (Benschop, 2009; Elfring & Hulsink, 2007; Emmerik, Euwema, Geschiere & Schouten, 2006; Farh, et al., 2010; Forret & Dougherty, 2001, 2004; Gould & Penley, 1984; Jolink & Dankbaar, 2010; Manning, 2010; Michael & Yukl, 1993; Nebus, 2006; Singh, et al., 2006; Tonge, 2008; Wanberg, Kanfer & Banas, 2000). Most of these networking studies focus on one type of network, such as friendship (Gould & Penley, 1984) and advice networks (Farh, et al., 2010; Nebus, 2006), or on the division between instrumental and expressive (or support) networks (Ibarra, 1992). Some look for antecedents of networking (e.g. Fahr, et al., 2010; Forret & Dougherty, 2001; Michael & Yukl, 1993), differences in networking, for instance between men and women (Forret & Dougherty, 2004; Tonge, 2008; Ibarra, 1992) or build conceptual models to better study and understand networking (e.g. Drach-Zahavy & Somech, 2010; Nebus, 2006).

These studies show the many types of relationships that can exist, their antecedents and consequences. Although those former studies have brought us understanding of the networking in which people engage, they provided a prevailingly quantitative account, labelling and scaling activities, of networking. Identifying networking actions and their consequences for networks in a quantitative way makes the networking actions as they are actually

done invisible, and does not provide an in-depth analysis of the complexities of networking, of the exact why's and how's. They abstract networking and networkers, lumping together network activities (e.g. "adding ties") and putting network content under the same umbrella (e.g. "advice"), without considering the idiosyncratic nature of networking. We argue in this chapter that networking is a social practice, and is therefore never done in the exact same way twice. It is the exploration of this idiosyncratic nature of networking that can help us build a more in-depth understanding of organizational networks and of what networking entails in actual organizational situations.

As earlier studies did not allow for the exploration of how networking is done in actual time and space, the idea of network agency is still underdeveloped in network studies (Manning, 2010; Benschop, 2009). This is acknowledged by network theorists writing about the present state of network research (Ahuja, Soda & Zaheer, 2012; Ibarra, Kilduff, & Tsai 2005; Kilduff & Brass, 2010; Kilduff & Tsai, 2003). The 'how'-questions, how do people engage in networking, what is it that people actually do when they network, i.e. when they build, maintain or end their network relations with others, have hitherto not received much research attention (Shaw, 2006). How do people negotiate, form coalitions, maintain contacts (Forret & Dougherty, 2001)? How are ties selected, added, or removed (Elfring & Hulsink, 2007), networks generated (Nebus, 2006), relationships built (Fahr, et al., 2010)? We need more knowledge on how people use, adapt, and change their networks of relationships and of the role of their (social) identities within networks (Benschop & Van den Brink, 2014; Ibarra, et al., 2005; Kilduff & Brass, 2010).

Mary Parker Follett once acknowledged the usefulness of focusing on verbs instead of nouns, saying it is better to keep to verbs as "the value of nouns is chiefly for post mortems…You can define the actors only in terms of the process" (in: Graham, 1995, p. 61). People's agency influences and changes their networks, which implies that networks are continuous processes instead of mere static entities (Parkhe, Wasserman, & Ralston, 2006). To come to a better understanding of these processes, in this chapter we develop a practice based approach towards networking to study in-depth and qualitatively what this 'networking' holds, how actors go about developing their ties. In the next section we explain what this approach is.

Practice-based research

The practice-based approach is not an integrated theory of the social, but a 'loose, yet definable movement of thought' (Schatzki, et al., 2001). The shared assumption is that practices – not structures, nor individuals - are the building blocks of social life (Schatzki, et al., 2001). Put simply, a practice is the engaging

in activities and carrying out of actions (Nicolini, 2009; Reckwitz, 2002; Schatzki, et al., 2001), such as a chef cook leading a restaurant kitchen, roofers laying down a roof, or flutemakers assembling a flute (Nicolini, Gherardi, & Yanow, 2003). In essence, practices are patterns of activities that are repeated over and over and become (implicit) routines (Reckwitz, 2002). At the same time, however, they are never completely the same due to their situatedness: social-economic, historical, and structural contexts impose limits as to how a practice is carried out (Corradi, et al., 2010; Nicolini, 2009; Nicolini, Gherardi, & Yanow, 2003).

Practice research starts from the premise that structures are (re)produced by social practices, with individuals being the reflexive agents who carry (out) the practices (Schatzki, et al., 2001; Reckwitz, 2002; Nicolini, 2009). By engaging in practices, individuals either reproduce social structures or challenge them. To understand this agency-structure duality, practice-based research looks at the details of everyday (organizational) life, at what people actually say and do, and has a processual, relational, social, constructive, and situated ontology (Nicolini, et al., 2003; Corradi, et al., 2010). Practice research thus always focuses on 'the local, the particular and the timely' (Suchman, 2003). Its vocabulary is one of verbs, of socially related idiom (Nicolini, et al., 2003, Corradi, et al., 2010). The goal of practice theory is the reconstruction of how social life is constituted by the "nexus of practices as body/knowledge/things-complexes" (Reckwitz, 2002, p. 258).

This nexus of practices informs individuals' actions, norms on what can and cannot be done, and in what manner, providing things with meaning and individuals with identities (Schatzki, et al., 2001). It is within practices that social relations, as well as individuals' identities are produced and reproduced (Corradi, Gherardi & Verzelloni, 2010; Nicolini, 2009). A practice "engenders a specific way of being for […] the interactants – what in social science jargon we could call […] specific and peculiar 'identities'"(Nicolini, 2009, p. 1409). Nicolini (2009) provides the example of a nurse engaging in certain practices that constitute "being a nurse". It is this practice approach that we apply to study the verb of networks: networking.

Networking as a practice

The practice approach enables the examination of agency, power, knowledge, and organizations, involving a variety of research strategies (Schatzki, et al., 2001):

> *The idea of practice is particularly appealing as it promises to re-specify a number of the phenomena that constitute the object of work in organization studies – from hierarchy to inequalities, from knowledge to innovation and change – in terms of a complex array and nexus of socio-material activities and their effects*
>
> (Nicolini, 2009, p. 1392).

We include 'networks' as one of those phenomena that can be re-specified by the practice approach. Benschop and Van den Brink (2014), Benschop (2009) and Manning (2010) argue that the attention in social network theory would gain from more emphasis on process dimensions of network formation. They advocate bringing in a practice perspective in network research. Gould and Penley (1984) already spoke of the 'practice' of networking: "the practice of developing a system or 'network' of contacts inside and/or outside the organization, thereby providing relevant career information and support for the individual" (p. 246). The practice-based research approach has however rarely been applied in networking research, and therefore, the 'practice turn' (Schatzki, Knorr Cetina, & Von Savigny, 2001) has not reached the study of (organizational) networks yet.

A practice turn in network research enables, as we contend and demonstrate in this chapter, the examination of the actual activities and strategies of network agents in particular contexts (Manning, 2010). This further develops our understanding of how a network in a specific form or a specific structure comes about, for instance: "[r]ather than merely 'identifying' strong ties, a relational practice perspective may help understand how strong ties are constituted in a particular context, for example, by renewing project-based contacts and by maintaining core partnerships" (Manning, 2010, p. 570). The concept of 'practice' enables accounting for what is tacit, familiar and taken for granted, and can help to understand the complexities of the modern (organizational) world (Antonacopoulou, 2008; Nicolini, et al., 2003). We thus not only look at the 'intentional ring' often associated with the term networking (Benschop, 2009), e.g. handing out business cards or tapping someone's shoulder at a conference, but take a broader conceptualization which also includes relationship building through presenting work to others, small talking over coffee, or giving a company tour.

From here on, we speak of *networking practices* to indicate that we examine networking as a social practice. The analyses in this chapter show us that networking is not only shaped by network factors such as network position and network embeddedness, concepts from 'traditional' network studies, but

that there are also other factors at play: actors' identity and practice-nets of organizational, professional and cultural/societal practices.

Networks are more than a conduit for instrumental and expressive exchanges; they are connected to individual's identities: "The people around us are active players in the co-creation of who we are at work" (Ibarra, et al., 2005, p. 363). Networking practices are informed by and reproduce the identities of networkers, in this case scientists, industry representatives and funding agency officers. When people develop their interpersonal relations, they thus also manage their identities (Ibarra, et al., 2005). The relation between identity and networks goes two ways: identity influences networks – e.g. differences in networks based on gender and ethnic background (Ibarra, 1992) – and a network helps shaping one's identity (Ibarra, et al., 2005). Knowledge on this co-evolution of networks is not well developed, yet may be valuable as we know little about the role networks play in creating and shaping identities (Jarzabkowski & Paul Spee, 2009). Additionally, we demonstrate how individuals' networking practices are not standalone practices, but are embedded in a nexus of other practices, which Nicolini (2009) calls 'practice-nets'. These practice-nets consist of organizational, professional, and cultural practices and inform and constrain networking practices.

In the next section on the research design we discuss the methodological choices we have made for this present study.

Research design

The empirical material for exploring networking as a practice consisted of the data from the first year of our qualitative case studies of two university-industry collaboration projects. We conducted observations of project meetings, held interviews with key participants, and studied project documents. Iterating between these data sources, we identified patterns of activities of the scientists, industry representatives, and funding agency program officers. In this chapter we go in-depth into these parties' networking practices, to achieve our objective to build an understanding of what networking as a practice is.

The cases: university-industry collaboration projects

Our cases are two university-industry collaboration projects in the Dutch technology sector. These projects are part of a larger trend of knowledge intensive networking for innovation, which is growing in importance as organizations are increasingly dependent on other organizations to develop their knowledge base and stay ahead of competition (Dhanaraj & Parkhe, 2006; Lam, 2005; Valk & Gijsbers, 2010). The nature of innovation development thus becomes increasingly

networked and open (Berkhout, et al., 2010). As interpersonal networking is a crucial aspect for university-industry collaborations (Bruneel, D'Este, & Salter, 2010; Gertner et al., 2011; Meyer-Krahmer & Schmoch, 1998; Swan, Scarbrough, & Robertson, 2003), the projects offer a good opportunity to look into what networking is and how people engage in it. Moreover, the fact that practitioners and scientists come together in these projects, offers an interesting opportunity to examine how the people from these two worlds "cross the divide" of industry and science through their relationship building with one another.

The projects were facilitated by a Dutch funding agency which subsidizes technology-related research projects, thereby helping to bring together universities and industrial companies. In this way, networks between scientists and industry are created to enable potential users of new scientific knowledge or technologies to be involved in the development of this knowledge. In the projects, industry representatives are informed by scientists about the scientific progress of projects through half-yearly meetings which are formally required by the funding agency. From the empirical material we learn that most representatives have a predominantly advisory role on the issue of utilization of the knowledge. Although the people from industry are formally referred to as "users" in these projects and by the funding agency, in this chapter and dissertation as a whole we prefer to refer to them as industry representatives, as their role is not always confined to the learning or use of knowledge. In frame 2.1 a short explanation of the goals of the collaboration projects is given, to provide more information on the context of the study.

Frame 2.1 General goals of the university-industry collaboration projects (all six under study)

From the survey conducted at the end of the data collection period (see chapter 5), we learned that knowledge development and university-industry network building were the two main project goals, taking all parties together. Knowledge development was the main goal, the raison d'etre, of these projects, and drove the networking between the scientists and the industry representatives. From the interviews conducted in the beginning we learned that the industry representatives participated to gain knowledge on the state of the art in and create bonds with universities, to increase visibility within existing or new markets, strengthen bonds with market players, or gain knowledge on what competitors were doing. The scientists were interested in the projects because they provide a platform to build and strengthen bonds with industry, offer opportunities to gain funding for scientific research, to conduct relevant and interesting research, and to publish papers.

For this chapter we studied a collaboration project in the medical technology sector (MediPro) and one in mechanical engineering (MechEng1) facilitated by the funding agency. Table 2.1 provides an overview of the (participants of the) two cases included in this chapter. Criteria for selection were that they started after 2009 and that the projects were still ongoing, to enable an examination of the development of the networks during the data collection period. Furthermore we chose these projects from different technology areas to prevent an area-specific account of networking practices. To keep the participating organizations and persons anonymous and non-traceable, we will neither discuss the topics nor the products central in the projects.

Data collection

Research into practices requires diving into the "unspoken and scarcely notable background of everyday life" (Nicolini, 2009, p. 1392). Making practices visible requires interpretative and qualitative methods which enable the examination of actual 'sayings and doings' of individuals, such as observations and interviews, accompanied by document analysis (Nicolini, 2009; Yanow, 2003). Observable are acts performed by people, language used and objects handled (Nicolini, 2009). Taking this into account, the main method for examining networking practices were observations of half-yearly meetings of the two projects. Observations can be one way of collecting data for structural analysis of networks (Wasserman & Faust, 1994), yet in that perspective this still comes down to counting interactions or exchanges of some sort. We have found that observations provide much richer data than the mere counting of ties, which can be of great added value for our understanding of interpersonal and organizational networks, as we show in this chapter and dissertation as a whole.

The half-yearly meetings we observed in the first year of the data collection were held in project MechEng1 at different locations such as the university or at the site of one of the involved industrial partners; in project MediPro the location was the academic hospital. The meetings lasted between two and four hours, often extended by lunch and sometimes a tour of the hosting organization. During the meetings, the observer sat in the back of the room, behind the participants, or at the conference table with the participants. She used a laptop or a notebook to record as much as possible of what was being said and done – before, during, and after the meeting. Due to the confidential nature of the meetings, it was decided not to record the meetings on camera or tape. The researcher arrived early, often before the participants arrived, and lingered after the meetings had finished, to be able to record the informal socializing and networking that went on in and around the meetings – including where the participants were seated and what the room looked like, with whom they

talked, what their input was during the meeting, who made jokes with whom, who looked at or whispered with whom, who interrupted others and who were silent. These aspects were part of an observation guide set up before data collection started (Appendix B).

Table 2.1 Overview of the cases.

Project	Involved parties	
MediPro	Project leader	Academic hospital A
	Fellow applicant	Academic hospital A
	Fellow applicant	Techn. Uni. B
	Fellow applicant	Academic hospital A
	Fellow applicant	Techn. Uni. A
	PhD student	Academic hospital A
	Postdoc	Techn. Uni. A
	PhD student	Techn. Uni. B
	Master student	Techn. Uni. A
	Industry representative	Technical device
	Industry representative	Measuring system
	Industry representative	Measuring system
	Industry representative	Software comp
	Involved: technicians	Academic hospital A
	Involved: professor	Academic hospital B
	Involved: program chair	Techn. Uni. A
	Program officer	Funding agency
	Management assist	Funding agency
MechEng1	Project leader	Techn. Uni.C RG 1*
	Fellow applicant	Techn. Uni.C RG 1
	Fellow applicant	Techn. Uni.C RG 2
	PhD student	Techn. Uni.C RG 1
	Postdoc	Techn. Uni.C RG 2
	Master student	Techn. Uni.C RG 1
	Master student	Techn. Uni.C RG 1
	Industry representative	End producer
	Industry representative	End producer
	Industry representative	Parts producer
	Industry representative	Parts producer
	Industry representative	End producer
	Involved: assoc. prof	Techn. Uni.C RG 2
	Involved: technician	Techn. Uni.C
	Program officer	Funding agency
	Management assist	Funding agency

* *RG = Research Group.*

Beside these observations, we conducted semi-structured interviews to better understand the projects, the networks that were part of the projects, and the organizational context of the participants related to their participation in the projects: their aims, experience, and knowledge concerning the projects. Interviews were held with 18 members of the two projects, among whom PhD students, project leaders (scientific researchers), industry representatives and program officers of the funding agency. The interviews lasted between 45 minutes and two hours. Respondents were asked about the general goals and their personal goals in the projects; how they got involved; what they thought of the progress and how this could be improved; what they saw as the role of the different network participants, including their own; how they would describe the nature of relations within the project group; how they knew the other participants and the nature of their contact with them, through the use of a network matrix; and what they thought 'networking' means. Appendix A of this dissertation displays the complete interview guide.

Finally, we collected documents related to the projects to gain further insight in the goals, networks, and progress of the projects. We gathered application documents, minutes, progress reports, and power point presentations. These are important information sources that complement the observations and interviews. Documents are more than information carriers – they are objects with both instrumental and symbolic functions. They played an essential (though often taken for granted) role in the networking practices of the project participants and were therefore taken as important in the study of the networking practices in the projects.

Data analysis

The analysis was an iterative process, going back and forth between empirical material and theory to build a coherent understanding of what networking practices constitute (Van Maanen, Sørensen, & Mitchell, 2007). The practice approach examines people's activities in an organizational context at the micro-level 'in the heat of the moment'. Our focal data source for the analyses to build an understanding of networking as a practice therefore consisted of the observations. First we read through all observations several times and open coded all potentially network-related activities recorded in the observations. From those codes, we identified patterns of activities that were engaged in by actors during and also outside of the formal parts of the project meetings, e.g. people giving presentations, scientists and industry representatives having discussions about results, socializing during coffee breaks, lunches, people giving tours or demonstrations. The networking practices discussed in this paper were patterns which we identified as typical networking practices by the

different parties within the collaboration projects, and are illustrative of the networking in and around the collaboration projects.

The danger of focusing on the myriad of small interactional moments is that one can easily be 'drawn into' the data and suffer 'death by data asphyxiation' (Pettigrew, 1995). To avoid this, we followed Nicolini (2009)'s suggestion to first 'zoom in' on practices, so to describe the patterns (i.e. practices) of discursive and material accomplishments, and then 'zoom out' to explore the embeddedness of these networking practices in the larger net or nexus of practices to understand how these enable or constrain the practice under study. This 'zooming in and out' enabled us to "understand both the conditions of the local accomplishment of practice and the ways in which practices are associated into broad textures to form the landscape of our daily (organizational) life" (Nicolini, 2009, p. 1392).

This way of analysing revealed how practices outside of the projects in which the different participants were embedded, enabled and constrained their networking with the other parties in the projects. Following Nicolini (2009), we labelled the total of these other practices as 'practice-net'. Zooming in on the micro-level network interactions, the analysis also taught us that and how the networking practices were informed by and reproduced their respective identities as scientists, industry representatives, and program officers: for instance, a scientific researcher explaining to industry representatives how commercialization is not important "for us".

We chose to categorize the networking practices following the lines of the three main parties in the collaborations – funding agency program officers, scientists, and industry representatives. We did so to understand how each party based on their identities and in the framework of their practice-nets worked on their relationships with the other parties, and how they were enabled or constrained in doing that. To show how networking practices can also be engaged in equally by all parties, we added a practice of networking in which none of the parties was the predominant actor: whole group socializing. In the next section, we report on the findings of the analysis of the empirical material.

Findings

In this section, we illustrate and analyse networking practices identified in the two university-industry collaboration projects: whole group socializing; networking practices of the funding agency and its program officers; of the scientists; and of the industry representatives. For every networking practice we analyse how the identity of the project participants and a net of organizational, professional, and cultural practices shaped and were (re)produced by those networking practices.

Whole group socializing

Before we go into the networking practices that were specific for the different parties, we discuss a situation in which networking was done on an equal basis by the scientists, industry representatives, and program officers: whole group socializing. This entails a typical practice that happened in both projects.

Networking in the projects entailed more than the mere 'instrumental' relationship building through the exchange of knowledge and other resources. Participants also engaged in networking practices directed at the social dimension of their relationships. This working on their social relations – which participants described as having a joint history, trust and openness, and knowing each other well – was an important practice in the projects. One of the quotes with which this chapter opened, described this as 'human contact', the social dimension of networking that enables the participants to reach the instrumental ('technical') goals in the projects, which is in line with Ibarra (1992)'s distinction between instrumental and expressive dimensions of networks. In the projects we noticed that this social relationship building between scientists and industry representatives was informed by and re-enacted cultural and organizational practices of socializing. For instance, the general cultural and organizational practice of having coffee and tea before meetings and during breaks was a practice performed in all the meetings observed - as were other occasions in which the groups came together, such as lunches before or after the meetings. In the projects, these moments were used for the building of social and informal relations:

> *It is the period before the formal meeting starts. People are arriving at the location of the meeting and step into the meeting room. They greet each other cordially, shaking hands and calling each other by their first name. From these greetings it quickly becomes clear that most of the people present have known each other for a longer time. One of the industrial representatives enacts his role of host of the meeting - as the meeting takes place at his company's site – by welcoming the guests and offering everyone coffee or tea and a local delicacy. To some guests he explains what this delicacy is. All scientists and industry representatives stay on their feet, mingle and talk about topics such as the weather, holidays, how things are going, and the, for some quite long, journey to today's meeting. Small talk lasts for over twenty minutes.*
>
> [Observation project MechEng1]

This is an example of a typical 'whole group' engagement in informal building of social relations through the practice of socializing over coffee. We see how this socializing is constituted by the enactment of several cultural and

organizational practices. The socializing starts with the generally accepted practice of greeting people when arriving, which works to (re)establish prior (or new) relations. Shaking hands is a culturally accepted way of performing that practice of greeting. Calling someone by the first name indicates the informal nature of the relationships and the existence of interpersonal trust, and the enactment of this practice reproduces that. Socializing for a large part consists of enacting what is generally referred to as 'small talk', another cultural practice associated with building informal relations. Small talk during the meetings concerned both project-related and unrelated topics. When talking about the project, participants discussed the relevance of the project or aspects of it, the methodology, tools and measurements, exchange of documents, unanswered questions, or recapitalize conclusions from the meeting. Other non-project related topics included travelling to and from the meeting, small talk about other projects or work, one's well-being, developments in the sector, introducing each other, and, of course, the weather. The latter is a culturally accepted and an (almost) standard topic of the small talk practice. We see in this example moreover that as the meeting took place at his company, the industry representative identified himself as host, which we derive from him performing the practice of welcoming and providing food and drinks to the others.

The social networking within the projects was thus influenced by cultural practices of socializing that are mostly taken for granted. Considered 'normal' behaviour during meetings, the practice of socializing through having coffee and lunch was an important opportunity for involved researchers and industry representatives to network informally, maintain or strengthen relations, and make new connections. Such cultural practices open up the opportunity for making (first) contact and give social gatherings 'meaning' and a space for talking and getting to know one another. For the researchers, the industrial representatives, and the funding agency officers, it could be said that the socializing practice was part of their professional practices, taken as 'normal' as none questioned the practice and all participated in it. Through engaging in this practice, moreover, they reproduced their professional identity and built a sense of group belongingness. In individual interviews, these moments of socializing were mentioned by scientists, industry representatives and funding agency officers alike to be important for the building or using of relationships in the projects.

From this analysis of the networking practice of whole group socializing we learn how networking practices of the project participants are embedded in practice-nets: socializing is done through the enactment of cultural practices and is part of the participants' professional and organizational practices. Enacting these practices constitutes part of their identity as professionals, which

is reproduced when the participants engage in these practices. This is mostly done unreflectively: nobody questioned the performance of the several practices (i.e. the greeting, shaking hands, using first names, having coffee and tea, etcetera). Additionally, we observe that objects formed an important element in this networking practice, as coffee and tea were used as an opportunity to build relations, and the local delicacy as an object for small talk. The practice of socializing enabled the informal connecting of the scientists and industry representatives, contributing to achieving the ultimate goal to develop new knowledge that benefits both parties, and the building of (stronger) networks between them.

We will now continue with the discussion of the networking practices of the funding agency, the scientists, and the industry representatives, respectively.

Networking practices of the funding agency

One of the main practices of the funding agency was to stimulate public-private networks by bringing together industry and universities into joint projects, and in particular through half-yearly project meetings required by the agency. Setting up their diverse practices of coordinating the projects and the networking therein, the funding agency acted as a broker between the two parties (Hanna & Walsh, 2002). The funding agency framed the networking practices of the scientists and industry representatives by facilitating and subsidizing the projects and prescribing project rules and procedures. Their practices of money granting and project coordination had become a practice on their own in the (Dutch) scientific technological world, for instance the writing of grant proposals in the format of the funding agency, and thereby shaped the networking within the projects into a pre-set mould.

The program officers and other project participants perceived the practices of the funding agency as predominantly organizational:

> *[The program officer] of course needs to take care that the rules of his organization are followed. That progress reports are handed in at the right times, that there are good interactions, monitoring if everything goes well, we need to do it and he needs to guard whether we do it and how it's going.*
>
> [Professor MechEng1]

The organizational practices of the funding agency and the related identity of the program officers limited the impact they were allowed to have in the projects: both program officers, scientists and industrial representatives said they had little influence on the contents of the projects. The program officer was

seen mostly as an administrative and monitoring actor. If a program officer stepped out of the confines of that identity, and mingled with content-related issues or asked many questions, this was not always appreciated, we learned from both interviews and observations:

> *You notice how [the officer] asks content-related questions, and that's fine with me. Not everybody agrees I think [laughs].*
>
> [Professor MechEng1]

Despite of this mere organizational role, this professor said that the specific program officer sometimes stepped out of this role by asking content-related questions. Knowledge plays an important role here: as the program officer once worked in an industrial company in the field, he was knowledgeable and apparently felt entitled to interfere in a manner that was not consistent with his formal role (as seen by others). This is a breach of identity: the program officer stepped out of his 'allowed' net of practices as funding agency officer into the domain of the practices of the scientists and industrial representatives. This particular officer brought together two identities – program officer and professional in the field – where others expected him to be only the first. As some interviews and observations suggested, this may have caused tensions among other participants.

It was in the program officers' bundle of practices of money granting and project coordination that they could shape the networking in the projects and influence the interaction and outcomes of the projects. Both the scientists and the industry representatives saw the funding agency as a guardian of the processes to make sure '*that their rules were followed*'. The funding agency's procedures formed a framework for the networking in the projects: required project meetings twice a year, contracts that bind organizations to the project, emphasis on valorisation of scientific results. During the observed meetings the scientists were dominant as they presented their research and results, whereas the industry representatives mostly sat and listened and commented on what they were shown. This in-meeting dominance of the scientists seemed to be a direct result of how the meetings were arranged by the funding agency: the pre-set agenda divided the scientific and the utilization part, dealt with the scientific part of the projects first, and then, as we observed, in practice that regularly left little room for discussing the utilization part due to time constraints. The use of the ties between the industry representatives and the scientists were thus framed by these practices as established by the agency.

From this analysis we conclude that the practices of the funding agency were part of the practice-net surrounding and impacting the projects. We learn

how a funding agency enacts 'brokering' practices and how those practices enabled and constrained the networking by the two parties of scientists and industry representatives. For an important part they thus framed the networking practices of the scientists and industry representatives. Being a relative 'outsider' to the networks due to their formal role and knowledge constraints, the representatives of the funding agency were only able - and allowed - to impact on the procedures, not contents, of the projects and thereby influence the course of the projects. We further elaborate on this point in the chapter on power in networking practices.

In the next section, we will observe how the scientists engaged in networking practices within the projects and the confines of the funding agency's practices.

Networking practices of the scientists

From the analysis we learn that the networking in which scientists engaged to build relations with industry were informed by and, through their enactment, reproduced the net of professional practices that formed part of "being a scientist". Moreover, the practices as set up by the funding agency shaped their networking practices, as we will see. Networking practices in which scientists engaged that we will discuss are, setting up projects with industry; networking with industry within the projects; building bridges through translating; and strengthening involvement through building reciprocity.

Setting up projects with industry Being a scientist implies engaging in a particular net of scientific practices, such as providing education and teaching students, engaging in the publishing culture, doing research in an integer way, setting up and proposing research projects, networking with other scientists through conferences, and arranging for funding for research. All these practices are part of "being a scientist". In academia, a career is built by engaging in those practices and following the norms of what is considered being 'a good scientist'. Building and maintaining network relations with industry is one (increasingly important) practice for scientists as part of their net of practices, as the value of science for society is becoming increasingly important, as well as the industrial funding of scientific research. The projects under study came about because of these societal pressures, for which the scientists engaged in this academic practice of building and maintaining networks with industry - e.g. aiming to build consortia or research communities through collaboration projects - to ensure the continuation of their research lines and publications, and in so doing reproduced their professional identity as scientist.

Networking with industry in the projects The networking practices of the scientists seemed dominant in the building and coordinating of the project

networks: it were the scientists who functioned as project leaders, developed the initial project ideas, took the initiative to do the project applications, and contacted and brought in industry participants – mostly from their prior networks. In short, engaging in these practices rendered the scientists (especially the project leader) mainly responsible for the project network formation and development. The requirement of meetings by the funding agency is informed by the generally accepted organizational and cultural practice of arranging formal meetings to get together (Alvesson & Due Billing, 2009). Additionally, during the meetings the scientists took up most of the time with presenting updates of the research and their results to the industry representatives. We did observe differences between MechEng1 and MediPro: the first contained mostly science-based presentations on research results, whereas the second included presentations on the progress of the development of instruments that were done in cooperation with industry. Yet, in both projects it were the researchers who did the majority (if not all) of the presentations. As we discussed in the previous section, this unbalance was the result of the practices of money granting and project organization as set up by the funding agency. These practices as dictated by the agency steered the course of the projects as a whole, and the meetings in particular. The agency's practices for these projects thereby not only enabled the coming together of scientists and industry, but also created a mould for their relationship building within the projects. The networking practices of the scientists were thus embedded in not only their own net of scientific practices, but also those from the funding agency.

Building bridges through translating We observed a networking practice performed during the project meetings which entailed that researchers explicitly tried to build a bridge between their research and the applicability for the industry representatives: through translating their research to the situation of the industry representatives. A clear observation in which this type of bridge building happened, was when a PhD student made an effort to 'keep things simple' for the industry representatives:

> *The PhD student is presenting the graduation project of one of his students. He starts with the question, "So what was this about again?", and gives a summary of his research. The PhD student is trying to keep his explanations simple, saying about some parts of his study, "That story is a bit complicated". He uses short movies of results to show what he is talking about. He then discusses an instrument he and his master's student developed, which could become part of the device which the industry representatives manufacture, but is currently as big as the device itself. He says, chuckling, "I don't see you hang that up in people's houses", and makes a remark about the applicability of the instrument for the*

industry representatives. One of them repeats and summarizes what he is saying. The PhD student then wants to do an, as he says, 'exercise': he shows some results in a graph and asks the industry representatives to look at it and tell him what they see in this graph, what do they pay attention to? Two industry representatives respond and explain to the student how they look at the results. They conclude that the PhD student and the industry representatives look at different things in the graph. There is not much time left, so the student then quickly continues with discussing several consequences of his results for practice.

[Observation project MechEng1]

This PhD candidate seemed quite sensitive to the information needs of the industry representatives and actively tried to 'translate' his findings to the knowledge framework of the industry representatives: "*I don't see you hang that up in people's houses*" - discussing consequences for practice. He thus actively used his relationships with the industry representatives as a channel to transfer and translate his knowledge to them. The formulas and stories told by the scientists were often fairly complicated and in-depth for the industry representatives to follow, which the PhD candidate here acknowledged: "*That story is a bit complicated*". He thereby explicitly tried to engage with the industry representatives' identities by taking into account their knowledge, and to relate to the industrial practice of producing consumer goods. His translation practice can also be understood as him learning as an early career scholar how to be a 'good scientist' by engaging the industry in his research project.

Additionally, by gaining knowledge on how the industry representatives work in practice through the 'exercise', he used his relations with industry to gain knowledge from them. In so doing, he brought the practices of scientific study and industry application together. This "translation" brought the different knowledge claims of the scientists and industry representatives closer to one another, and thereby for the moment strengthened the bridge between the parties. In the project meetings, this translation practice for a large part took the direction from scientists to industry people, though in project MechEng1 the industry representatives were also trying to translate their knowledge to the scientists. In project MediPro the relations between the industrial representatives and researchers were also used for transfer and translation of knowledge, but there it was done through mutual engagement in the development of certain instruments. We can conclude that this practice of translating was a bridging networking practice as it helped to build stronger relations between two (or more) persons across the functional divides: building a common understanding of an issue or problem and working on an instrument together helped to use and strengthen those relations.

Strengthening involvement through emphasizing reciprocity One of the practices established by the funding agency that (potentially) steered the networking between the scientists was the so-called continuation decision: after one and a half or two years, industry representatives and the funding agency were required to assess the project and determine whether they were pleased with the progress of the project, to decide whether they would continue their support for the project. The following observation shows how this practice enabled researchers to try and bridge the worlds of science and practice. The observation was done in a meeting in MediPro in which the continuation decision needed to be made:

It is the third meeting of the project, and several of the researchers present what they have been doing in the last year. The post-doc of the project explains about a robot arm he and a master's student have been developing together with one of the industry representatives. One of his last slides is titled "Added Value" and points out concrete points on which the project can benefit the specific industry representatives and vice versa. He asks, "What can we do for each other?" and shows that the industry representative can bring in design expertise for the researchers, and the researchers can provide the industry representative with interesting data. The next presenter, one of the PhD students on the project, also shows her activities (in cooperation with two industry representatives) and – this seems coordinated between the researchers - also ends with a slide with the mutual added value for the industry representatives and the project.

[Observation project MediPro]

This observation shows one of the basic assumptions of networks: reciprocity. It is emphasized how the different parties can both give to and take from the project. We again see how early career scholars learn how to be a 'good scientist' in the sense that they show awareness of the relevance of the relations with industry. They learn the practice of relating to industry. However, the industry representatives in this particular project seemed to be in the service of the project instead of the other way around. The emphasis in this project was on the scientists and how they viewed the input of the industrial partners. The input of the industry representatives was to provide and enhance their products to be used in the project for measurements in a medical measuring system to be developed. Although in the meeting the added value for them was touched upon - both in the presentations and by the industry representatives themselves in presentations they prepared for this continuation meeting - the emphasis of the whole project at that moment was on the scientific goal of fixing the measuring system, which the scientists needed to conduct their

research. Adapting the products of the different industry representatives was instrumental, a means to get to that system, not a goal in itself within the project – for the scientists at least. Explicitly mentioning the added value for practice may have functioned as a means to convince the funding agency's program officer and the industrial partners that the research was going well, and that the researchers were willing to incorporate the industry's input.

From these analyses we learn how networking, nets of practices, and identity intertwine. We observed how the networking practices of the scientists within the collaboration projects were predominantly driven by the net of professional and organizational practices that goes with "being a scientist". These are practices outside of the projects such as doing fundamental research, publishing, and attending conferences. The projects themselves were part of that net of practices. Their networking with the industry representatives was driven by their main goal of academic knowledge production - that has societal relevance - and was stimulated through the increasing pressure to gain money from industry and conduct research that is of value for society. These practices determined how the scientists built and maintained their networks within (and outside) the projects, i.e. with the industry representatives. In turn, engaging in these practices reproduced what "being a scientist" constitutes. We also learned how their networking practices in the projects were greatly influenced by the practices of the funding agency.

We will now turn to the last section of the findings, in which we discuss the networking practices of the industry representatives in the two projects.

Networking practices of industry representatives

The industry representatives engaged in networking practices within the projects as part of their practice-net and identity being an employee of an industrial company, of which being a project participant and, as such, networking with university scientists, was one practice. Their practices in the projects to help them build relationships with scientists and other industry representatives consisted of attending the meetings, commenting on the scientific presentations of results and bringing in knowledge, material and money to steer the projects towards practical applicability. Also, they engaged in the practice of lobbying within their own organizations to gain resources (time, money) to be able to provide that input in the projects.

Steering towards practical applicability was done by industry representatives by asking critical questions and giving suggestions during the meetings, providing materials and data, helping with or advising on measurements. Another way to impact the projects and increase visibility were guided tours.

In project MechEng1, the participants had established the practice of having tours around the sites of the hosting organization where the meetings were held. Following is a description of one of those tours:

> *After the meeting, the host of the day (an industry representative) asks us to come with him for a short product demonstration and a tour around the factory halls. The group follows him out the room, across the reception hall and into a room with showcases of his company's products. Some of the products are displayed fully, others are partly opened up to give a look on the internal mechanisms. The host guides the researchers and other industry representatives – some of whom are suppliers, clients, or competitors of his company – to every showcase, explaining what the displayed objects are, how they function, why certain designs were chosen and how they are produced. The audience listens with care, asks questions and walks closer to the showcases to take in more details. After about 10 minutes in the room, the host takes us to the factory floor, where a couple of employees are sitting on workbenches. In this hall and the next, large cabinets with hundreds of machine parts and completed products are waiting for the next step in the assembly process. The host explains to the group what they are and how the production process works, ending with an explanation of a large conveyor-belt in the middle of one of the halls. During the tour, participants discuss with the host and with each other about what they see and hear.*
>
> [Observation project MechEng1]

Showing researchers and other market players (competitors, suppliers and clients) around the company site was a chance for those guests to get to know the hosting company in a more informal way. It enhanced the knowledge of the other involved industry partners visiting the site of other organizations or of the participating university. It provided participants a "*peek into the kitchen*" of the other participants and provided them "*a way of bonding in a different way than through the usual commercial relations of buyer – supplier or competitors*" and gives "*slightly more insight into their internal organization*" (industry representatives). Instead of statically sitting down, walking around the halls and looking at product parts gave the participants an entry for conversation, a topic to talk about, which eases interactions. The objects at display thus became opportunities for networking, as people from different companies and researchers engaged together in conversations related to the objects at hand, or other topics.

From the interview with the industry host central in the excerpt, it appeared he saw himself as not having much input or impact on the project, as he did not have enough background knowledge or education to do so. Moreover, the

stakes of participating in such projects were not very high for his company, as they did not design and produce a new version of their product often. Their development of innovations was low in comparison to, for instance, one of their competitors that was also part of the project. His identity as an outsider made him feel relatively detached from the project. During one observation, he told the researcher before the meeting started that "*everybody pretends they get it, but nobody really does*". His identity as 'outsider' was visible as he was usually quite quiet during meetings, and did not add much to discussions. This identity thus constrained how the industry representative gained visibility in the project. Yet, although the industry representative did not seem to have much say within the project, giving the tour provided him with the means to influence the project to some extent. Tours are a good opportunity for companies to show their own practice-net of manufacturing, innovating and managing to the other industry representatives and the researchers. What is usually mere 'context' for the projects, shortly becomes the main object of focus:

> *It's good for the other manufacturers to see how things are organized at another manufacturer…and it is also good for the PhDs, graduates and other researchers to stand on a work floor, to see how things go in practice, in 'real life'…I know, when you're in such a testing environment all day it is hard to imagine how it works in practice. There is a big difference between what happens there and here. I think it's good to see how things work in practice…so you know what you're doing [the research] for.*
>
> [Industry representative MechEng1]

The industry representative assumed the scientists did not have knowledge about what goes on in practice. By giving the researchers an understanding of what the industry representative may end up doing with the project results, his idea was that they might become more inclined to pay more attention to the application of results and less to mere scientific knowledge generation. The organizational practices of manufacturing, managing and innovating and the objects at display were used here in and for networking: to increase the industry representative's visibility and change the scientists' knowledge about his organization's practices, in the hope of steering the projects toward practical applicability. The project thereby (momentarily) shifted from a scientific to a more practical focus. What is interesting in this quote, is that the industry representative refers to his organizational practice as 'real life'. He thus identifies himself as working in the real world, whereas science and 'standing in a testing environment all day' is separate from this real life.

Lobbying Besides the steering of the projects toward practical relevance and

applicability, the industry representatives needed to lobby for priority as employees within their own organizations to be able to provide input in the projects as project participants:

> *A student involved in the project is presenting his findings. He has done an internship within one of the industry representative companies, and helped develop a robot arm which will be used in the measurements. Part of the instrument was outsourced to a start-up company of one of the involved technical universities. The engineer manager of the student's company takes over the student's talk along the way. He says he prefers to develop the robot arm in a certain way, but is not certain whether he is able to do so as it depends on the priority his boss may or may not give to it. One of the other industry representatives agrees and says jokingly, "that's a universal thing with bosses".*
>
> [Observation project MediPro]

The excerpt illustrates how tasks were delegated to an outside company – which becomes an indirect relationship that is of influence on the project. This delegation of tasks to another company was done because the manager of the industrial company did not have the resources, money and time, to work extensively on the project. The net of practices within his organization limited his input to the project. The hierarchy within the industry representatives' organization was presented as a constraining element on the representatives' space for action within the project. The excerpt shows how the last industry representative reflects on this hierarchy ("*universal bosses*"), using the word 'universal' to emphasize the common challenge both industry representatives have and identifying with the other industry representative. The limiting framework 'set up' by bosses was seen as a general organizational or even cultural practice. At the same time, this playful remark implies that this is an undesirable practice. The bosses here are presented as distant and invisible, yet influential actors, officially outside the projects and the immediate project network, but with a large impact on the room the representatives have to influence (the outcomes of) the project.

Another organizational practice framing the networking of the industry representatives was that within the industrial companies, daily operations had priority, whereas networking for innovation was not considered essential for their survival as it was to the scientists. Therefore, little money or time was made available to the industry representatives to spend on the projects. Also, the context of the financial crisis ensured that some industry representatives had little leeway in the projects, constraining their input.

During one of the meetings of MediPro we witnessed how the lobbying of

industry representatives within their company was not effective for them to be able to provide the scientists with a usable device, and so the scientists were included in this lobby:

> *One of the involved professors asks a industry representative what the researchers can do with this industry representative's contribution in the short term. The project is already delayed and the professor is now trying to push the industry representatives into getting more active. The professor says not to be interested in the long term, "commercialization is not important for us. When will their device be ready?" The industry representative responds that it is difficult to say, as he depends on his boss: "I suggest you call my boss, to give me time to develop it further." This in first place innocent and seemingly non-serious suggestion sparks a discussion as to indeed who should call his boss. The program officer of the funding agency asks: "Who has the most influence?" The project leader points to the professor, as he "has good contacts". The professor responds that he cannot determine the priority of the industry representative's company, but does so with an intonation that he will make the call. The program chair then suggests he emphasizes the urgency of the situation when calling the industry representative's boss: "You need to say it is urgent, that this needs prioritizing, he is sensitive to that".*
>
> [Observation project MediPro]

We see here how practice-nets enabled and constrained networking through the differing practices of scientists and industrial partners regarding commercialization. In this excerpt, the practice of general knowledge production and the non-commercial orientation of science was emphasized. The difference between the scientific practice of doing (fundamental) research and the industry practice of commercialization of knowledge is noticeable here, as the professor emphasized his difference in interest regarding the long-term consequences for the industry: "*commercialization is not important for us*". The need for commercialization is not part of this professor's identity; it is not part of his practices of "being a scientist". With this statement, the professor not only reproduced the scientific practice and disregarded the practices of industry, but also activated and enhanced the divide between 'us, scientists' and 'you, practitioners'. These identities and interests are thus made explicit and reproduced in his networking practice. We also note how hierarchy within industrial companies constrained the networking practices of the industrial representative and how it was actively reproduced by the representative through his referrals to his boss. 'Being a good employee' made him refer to his boss in order for him to also be a 'reliable industry project participant'.

From this analysis we can conclude that the most prominent ways of industry representatives to build and use their relationships with the researchers in the projects were joining half-yearly meetings, critically questioning the scientists' presentations of results, and bringing in money, materials and knowledge from the field. Being "an industry representative" within the projects, the industry representatives were 'caught in the middle' of two identities and practice-nets: as 'good project participants' and 'good employees' they needed to find a way to impact on the scientists' research practices (e.g. by giving tours) and they needed to find a way within the practices of their own organization to gain enough resources to make a difference in the project. The goals of the projects and the way they were arranged, the nature of the industry representatives' knowledge base, and their often non-management status in the projects, constrained the input they were able to provide in the innovation projects. This led them to engage in networking practices such as giving tours and lobbying to increase that input. As for the other parties, we observe how networking, practice nets, and identity intertwined and drove the building and using of relationships in the projects.

Discussion and conclusion

In this chapter, the objective was to further develop a practice-based approach to studying networking (Van den Brink & Benschop, 2014; Benschop, 2009) to contribute to knowledge on agency in networks. Building on the idea of networking as a social practice, we examined how participants in university-industry collaboration projects actively engaged in building, maintaining, and using their interpersonal networks. Our analyses thereby explored the 'work' that goes into networking and hence into networks. In so doing, the chapter showed how the practice approach can provide us with a better understanding of the agency that occurs at the interpersonal level within networks, which is a relatively unexplored area of research (Ahuja, Soda & Zaheer, 2012; Ibarra, Kilduff, & Tsai 2005; Kilduff & Brass, 2010; Kilduff & Tsai, 2003; Manning, 2010). We learned how the practices of networking we observed are embedded in nets of professional, organizational, and cultural practices, which are related to the participants identities. These practices and identities informed the participants' networking with one another, and were reproduced through their networking. Together, identity and the practice-nets enabled and constrained the networking practices of the diverse actors. For instance, the practices of the funding agency enabled the scientists and industry representatives to come together and build relationships, yet those practices also framed and thereby constrained their networking practices.

By further developing the notion of networking as a social practice, we contribute to the call for more agency-based research in the study of (organizational) networks (Van den Brink & Benschop, 2014; Manning, 2010; Benschop, 2009). Building this notion, we helped to construct a way to study the agency side of the network coin. We opened up the black box of how interpersonal ties are built and maintained in 'real time and space'. To specify our contribution to network studies, we derive five theoretical lessons from this study of networking practices. We conclude with relating our development of the notion of networking as a practice to the other chapters of this dissertation.

First, we contributed to network studies by learning about the nuances, subtleties and intricacies of building and maintaining ties at the interpersonal level. Through its focus on actual sayings and doings (Corradi, et al., 2010; Nicolini, Gherardi, & Yanow, 2003), the practice approach provides room for a finegrained examination of networking, and thereby brings us an in-depth 'bottom-up' picture of networks. This helped us to capture not only the intentional, but also the unintended (i.e. not having network building as a direct goal) relationship building. We saw for instance how small taken-for-granted cultural practices such as shaking hands and calling others by the first name indicate and reinforce the informal nature of relations between people and thereby help to build and maintain networks. From the analyses we learn that all moments of contact between individuals, no matter how small they may seem, help to establish and maintain interpersonal relations. This adds insight to structural network analyses and to earlier networking studies, which studied only a limited set of tie types (e.g. friendship, advice) and did so in a quantitative manner, which leaves out the small, and potentially crucial, interactional (and multiplex) moments which impact on the relationships between actors or the value of those ties.

Second, we provide a complementary approach to the analysis of ties and network structures by including the identities of network actors in the study of networking, and by bringing in the context of the actors and their relationships through the notion of the practice-nets in which the networking is embedded. Our exploration of networking as a practice in the context of two university-industry collaboration projects encompassed an analysis of how identity and practice-nets shaped the networking of the project participants. "Being a scientist", for instance, is constituted by many practices, among which networking with industry is an (increasingly) important practice. We learn that networking practices are both enabled and constrained by people's identities and the organizational, professional, and cultural practices surrounding them. In line with the different identities and practice-nets of the diverse parties – scientists, funding agency officers, and industry representatives – project participants had

different interests, goals for, and ways of networking within the collaboration projects, and were enabled and constrained in their relationship building within the framework of the projects in different ways.

We analysed how identity – "a specific way of being" (Nicolini, 2009) - was connected to networks and networking, an underdeveloped area of study (Ibarra, et al., 2005). We observed how scientists practiced "being a scientist" or 'being a project leader", and how industry representatives practiced "being a (good) project participants" and "being a good employee" within their mutual relationship building. We found that networking within the projects was informed by the practice-nets that go with those different identities. Practice-nets, the 'practice bundles' in which the networking practices are embedded (Jarzabkowski & Paul Spee, 2009), such as the hierarchical relations within the industrial companies and the lack of money and time available in those companies, constrained the room the industry representatives had to provide input in the projects. Those practice-nets were also used as a resource by these representatives to increase their visibility and underscore their interest in the innovation projects, as the 'guided tour' observation demonstrated.

As we can see, the practice approach to networking provides an in-depth understanding of how networking practices are embedded in organizational and industrial contexts via the concept of the 'practice-net' (Nicolini, 2009). The practices of the funding agency for an important part framed and sustained the instrumental and social networking practices scientists and industry representatives engaged in. Due to their identity as a program officer, being a relative outsider to the networks due to knowledge constraints, the representatives of the funding agency were only able - and allowed - to impact on the procedures, not the contents of the projects. Instead of only examining the nature of the ties, the practice approach thus enabled us to include the actors and give these actors 'a face' to better understand how and why those ties come about, which drove us to also examine the context of those actors in relation to their networking practices. We saw for instance how a scientist reproduced the difference concerning commercialization, emphasizing this being part of the practice-net of industrial representatives but not scientists. As such, the practice approach enabled us to respond to Ibarra et al (2005)'s call for the development of knowledge on the mutual relations between networks and identities.

Third, we saw that networking practices are idiosyncratic in the sense that they are contingent to the situation; depending on the context, people adapt their actions to accommodate to their own benefits, and/or to the value of the project as a whole. This is where a practice approach to study the agency side of the network coin contributes to our understanding that networking cannot be neatly categorized into 'advice' or 'friendship', or 'instrumental' or expressive'.

To really understand how and why an (organizational or inter-organizational) network is built and developed, we need to dive into the actions, contents and situations of networking, to understand the agency and, eventually, the outcomes (i.e. benefits) of that agency for the different network actors.

Fourth, a lesson of studying networking as practice is that we uncovered how specific university-industry networking practices (e.g. tours, translating) were developed in the projects to cross the boundaries between the different actors. Participants tried to overcome differences in identity and knowledge, building bridges by explicitly mentioning the benefits for the other parties ("translating") or by drawing other project participants into their particular practice-nets (invitation for research seminars, company tours).

The fifth and final theoretical lesson drawn from the study relates to the concepts of power and inequalities. The analysis pointed to how people have different drivers for networking and different roles and input in their networks, related to their identity and practice-nets. Our illustrations of networking practices showed how the practices were also related to power inequalities between the industrial representatives and scientists: due to the set-up of the projects and the practice-nets related to science and industry, the scientists' core practice of academic knowledge production was central to the projects, leaving less room for the practical relevance and applicability. The illustrations showed how that asymmetry was produced and reproduced by networking practices of scientists and the funding agency, but could also be challenged by industrial representatives – e.g. via tours and product demonstrations. We also observed a professor using his status to gain priority from an industry boss, mobilizing a network as power resource. From the study of networking through a practice approach, we thus learned that power and hierarchy inform networking practices. This is in line with the idea that practices are always in someone's interests, and thus by definition, a political endeavour (Nicolini, 2009). This lesson also points to the relevance of the critical diversity perspective on networking as a practice, as that focuses on power and inequalities. To build a more profound understanding of this role of power and develop such a critical perspective on networking practices, we take up this topic in the next chapter.

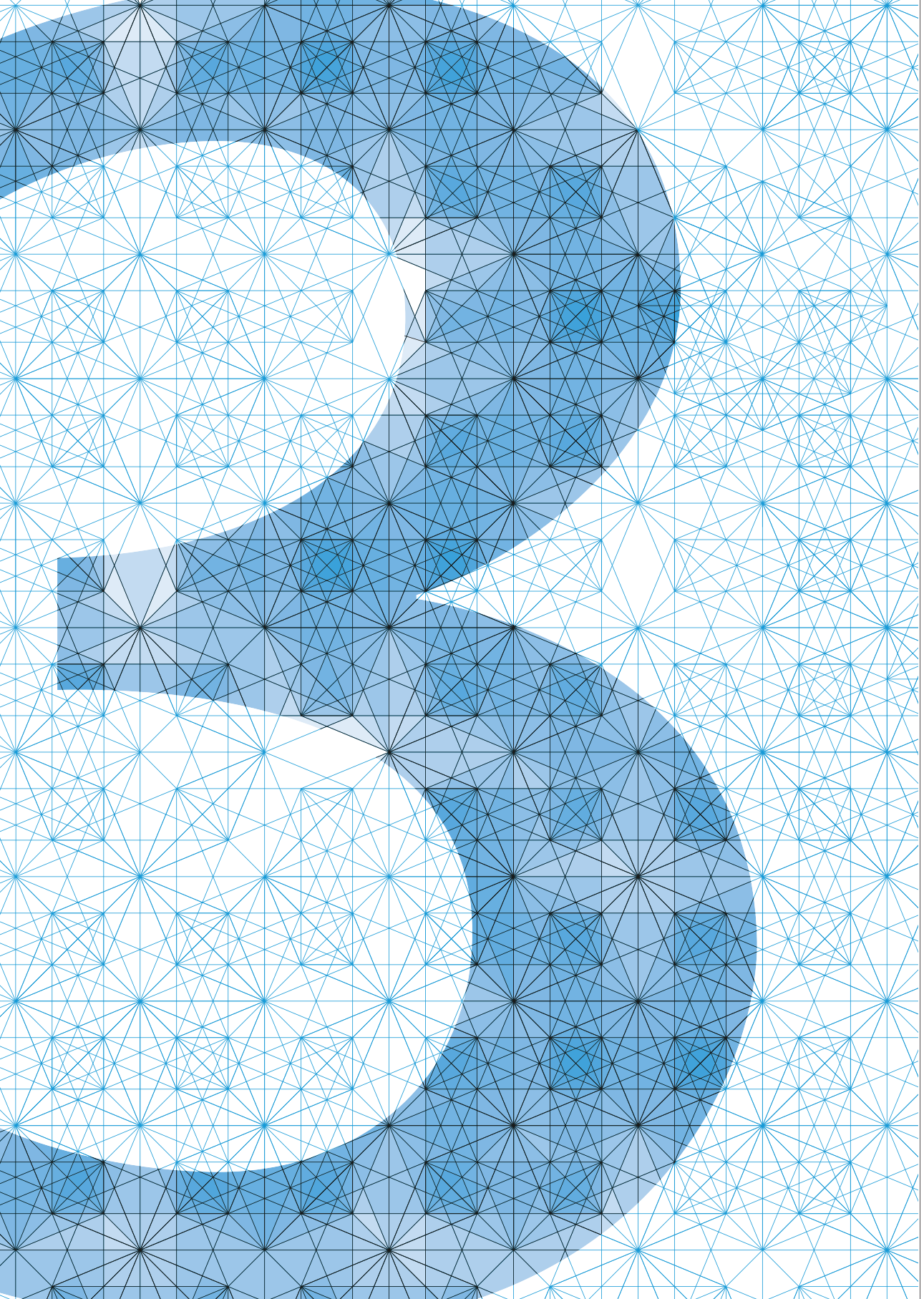
Reconsidering the definition of networking practices

Following the analyses and the theoretical lessons, we want to reconsider the definition of networking practices as based on Benschop (2009), used as a basis for the research in this dissertation: "dynamic, socio-political actions of people when they enter, build, maintain, use, and exit their relations at work". This definition focuses on the agency side of networks: 'actions' are the central entity within the definition. The practice approach indeed allowed us

to study the micro-level activities of networking that constitute networks. But this is not the whole story. To focus on agency alone would leave an important aspect of what networking practices entail implicit and unattended: the wider structures in which agency of network actors is embedded and which it (re) produces. Drawing on structuration theory (Giddens, 1979, 1984), we contend that networking is the result of the continuous intertwinement of structure and agency. We will show in the remainder of this dissertation how the 'duality of structure and agency' in different ways drives networks to be dynamic. The definition of networking practices as established earlier, is therefore insufficient. We add the element of structures to the definition of networking practices: they are the "structurally embedded, dynamic, socio-political actions of people when they enter, build, maintain, use, and exit their relations at work". This definition brings in the finding of this chapter that actors' network actions are both structurally informed and shaping structures. We use this renewed definition in the rest of the dissertation.

Recapitulation

From our first exploration of networking as a practice we learn that, how the scientists, industrial representatives and funding agency officers in the two projects networked was part of and reproduced their professional identities and their respective 'practice-nets', which included the professional, organizational, and cultural practices in which they are embedded. This puts actors' networking practices in the bigger framework of their individual and organizational environments, i.e. of their working and organizational lives. From this we conclude that it is impossible to build an understanding of networking practices without taking structural aspects - in a sociological sense - into account. This points to the duality of agency and structure in networks, which is explored further in the remaining chapters, in which we relate networking practices to structures of social systems and power (chapter 3), gender (chapter 4) and network structures (chapter 5 on network dynamics).



Networking practices

as works of power in university-industry collaboration*

* *An earlier version of this chapter was presented as a paper at the 2014 Colloquium for the European Group of Organization Studies (EGOS), Rotterdam, the Netherlands, in the stream "Unsettling Boundaries: Practices of Inter-organizational Collaboration" (Berger, Benschop, & Van den Brink, 2014).*

Abstract

Building on the previous chapter, in chapter 3 we combine the practice approach to networking and the critical diversity perspective to explore how power is enacted through networking practices. We do so by conducting an in-depth case study of MediPro, a university-industry collaboration project in the field of medical technology. We build upon Giddens' structuration theory (Giddens, 1979, 1984) to explore how project participants enact power through engaging in networking practices in the context of this collaboration and of the broader social systems in which the participants move. The study allows us to contribute in two knowledge domains. First, the study adds to the development of the notion of networking as a practice by building a relational understanding of power in networking. This approach is relatively underdeveloped (Swan & Scarbrough, 2005). Second, it adds to university-industry literature by exploring how power is an inherent part of university-industry collaborations. As practical implication and a conclusion to the chapter, we incorporate the findings into the exploration of the idea of a "third space" for university-industry collaborations. In this ideal-like space, we argue, scientists, industry representatives, and funding agency officers work on their mutual relationships to strengthen the bridge between science and industry and eventually come to power-balanced and productive collaboration and innovation development.

Key words: *networking practices; power; practice approach; university-industry collaboration; structuration theory*

> *Well, look, I like the interaction with scientists, and they can't help it either. The better bunch are slightly aware, the ones that are worse are completely hospitalized, as I call it. Like when you enter a hospital, after two or three days you are so submerged in that little hospital world that that is the only thing you know, and soon[...] you totally participate in that little world and everything becomes small and irrelevant outside and important inside. And that is what also happens in science.*
>
> [Industry representative, project MediPro]

> *They [industry] want as little theory as possible. They just want to know, where can I drill a hole, so [the device] is quiet [joke]. That's the level they would like, but I'm afraid that's not a useful road to take.*
>
> [Full professor, project Mechanical Engineering]

These quotes form a, perhaps somewhat inordinate, illustration of how industry representatives and scientists perceive each other: they see differences between the worlds of science and industry in goals, practices and what is considered relevant knowledge. In this chapter, we explore from the critical diversity perspective how this diversity of backgrounds present in university-industry collaborations renders networking practices between university scientists, industry representatives, and funding agency program officers power-laden.

Introduction

University-industry networks are an important way through which innovations come about (Gertner, Roberts, & Charles, 2011; Kronjee & Nooteboom, 2008; Perkmann & Walsh, 2007; Siegel, Waldman, Atwater, & Link, 2003; Cohen, Nelson, & Walsh, 2002). It is generally acknowledged that interpersonal networks are important building blocks for the interactions between universities and industry (Bruneel, D'Este, & Salter, 2010; Gertner et al., 2011; Meyer-Krahmer & Schmoch, 1998; Swan, Scarbrough, & Robertson, 2003). Organization-level relationships and the generation of innovation often result from informal social relations between individuals (Perkmann & Walsh, 2007). Also, informal relationships form an important knowledge spill-over mechanism (Cohen et al., 2002; Ponds, Oort, & Frenken, 2010): "networking helps to address the transactional 'stickiness' of knowledge by promoting trust and stimulating value creation through innovation" (Swan et al., 2003: 684). Networking, the building of trustful interpersonal relationships, is thus deemed important for successful university-industry collaborations.

The attention for trustful interpersonal relationships within university-

industry collaborations is not paralleled by attention for power in those relationships. Yet, chapter 2 hinted at the role of power in networking practices when it demonstrated how practice nets and identities enabled but also restricted the space people had to build interpersonal relations. In line with those findings, we argue in this chapter that power is intrinsic to networking practices between scientists, industrial representatives, and third parties - in our case, a funding agency's program officers. The premise of university-industry collaborations is diversity. As a consequence, conflicts, differing interests and misunderstandings may arise, as these collaborations include people from different social systems and with different interests (Levina & Orlikowski, 2009; Meyer-Krahmer & Schmoch, 1998). These social systems are constituted by different structural rules, resource distributions, and social practices (Giddens, 1984). The practice-nets and identities of which we spoke in the previous chapter form part of these social systems. These differences may render collaboration difficult and power-laden. In this chapter we therefore explore how networking practices between scientists, industrial representatives, and funding agency officers in university-industry collaborations are infused by power. We ask, *how are networking practices in university-industry collaborations works of power*?

We combine the practice approach towards networking with the power conceptualization of Giddens' structuration theory (1984) to answer this research question. The networking-as-a-practice approach, as we concluded in the previous chapter, asks for a conceptualization of power that connects agency of actors to structures. Giddens' structuration theory centres around the notion of social practices. Power in this theory is a structural property of social systems and is enacted through social practices in the form of 'transformative capacity': "Power is the means of getting things done and, as such, directly implied in human action" (Giddens, 1984, p. 283). This conceptualization of power sits well with our notion of networking as a practice. We apply this theoretical framework to the case study of MediPro, a medical technology university-industry collaboration project. Drawing from observations, interviews, and document analysis, we explore how participants in this particular case enacted power through their networking practices to resolve issues they came across.

The study contributes in two domains. First, the study contributes to the further development of networking as a practice. We contend that if we want to understand what networking practices are and how they affect interpersonal networks and projects, we need to go beyond the generally accepted notion of the importance of trust and also incorporate the political dimension of networking. In this chapter we therefore explore how power is implicated in networking as a practice.

Second, the study contributes to knowledge on the role of power in university-

industry collaborations, which to our knowledge is an understudied area of interest. The chapter builds a better understanding of the role of power in interpersonal networking, which enables and constrains the proceedings and outcomes of the collaboration. Approaching networking practices as inherently power-laden helps to build a better understanding of the differing interests, backgrounds, potential conflicts and their solutions in university-industry collaborations. Such an approach can provide us with better insight in the process of university-industry collaborations and help enhance the management of these collaboration projects. The study leads us in the final section to explore the idea that collaboration between universities and industry would ideally flourish in a 'third space'.

The chapter is structured as follows. First, we explicate the theoretical background of the study, discussing research on power in networking, conceptualizing power on the basis of Giddens' structuration theory, and shortly explaining the notion of networking as a socio-political practice. Next, we discuss the empirical study of this chapter: a case study of a government-subsidized university-industry collaboration project in the medical technology sector. We elaborate on the research design and then on the findings. In the discussion, we discuss theoretical contributions of the study and explore the idea of a 'third space' in university-industry collaborations.

Theoretical framework

Power in networking

The field of network studies is broad and covers studies from individual to multi-organizational networks, and ego to whole networks. Our focus is on interpersonal networking practices, as the interpersonal relations between individual scientists and industry representatives are essential for university-industry networks (Bruneel et al., 2010; Gertner et al., 2011; Meyer-Krahmer & Schmoch, 1998; Swan et al., 2003). More specifically, we study the power practices that intertwine with these interpersonal networking practices.

Power in relation to networks has often been studied as a property or outcome of networks: of centrality, network size, closeness to certain others, or related to network perception (Brass, Galaskiewicz, Greve, & Wenpin, 2004). People with more accurate cognitions of an advice network are rated as more powerful by others in the organization (Krackhardt, 1990). Early adopters of a new technology gain more centrality and hence, power, than late adopters (Burkhardt & Brass, 1990). Centrality in an advice network shapes job-related perceptions more than individual attributes and formal organizational positions

(Ibarra & Andrews, 1993). An individual's network centrality and position in the organizational hierarchy, together with certain behaviours, are related to others' perceptions of that individual's power (Brass & Burkhardt, 1993). Ibarra (1993) concluded that an organization's informal networks may be more critical than its formal structure for the exercise of power. These earlier studies show how important (informal) network relations are for people to 'have' power. They approach power as a resource that is derived from an actor's network or network position. This is very insightful, yet to gain apprehension of the dynamic and non-zero-sum nature of power within networks, it is necessary to take a practice perspective on power.

Other than as a resource, power can also be conceptualized as a characteristic of social relations that is produced, reproduced or changed through social interactions (Levina & Orlikowski, 2009). This conceptualization of power has been largely neglected within studies on networking, despite that it lends itself well for this due to its relational focus. Using a conceptualization of power based on Lukes (1974), Swan and Scarbrough (2005) studied politics in three cases of what they called 'networked innovation' of firms. They found that network coordination at interpersonal, intra- and inter-organizational level was critical for the network development in the innovation process, and that power over process and meaning was more important than power based on hierarchical resources. Hislop et al. (2000) studied intra-organizational decision-making in the context of the early phases of implementation of IT-based organizational change, in which organizational culture, hierarchy, and resistance played a significant role in the political processes. They found that networking was both a conduit for gaining access to knowledge and a political tool for supporting particular interests, yet power in the form of hierarchical authority structures was the focal contextual factor of their paper. The authors conclude that "the development and use of both networks and knowledge during [innovation implementation] processes cannot be separated from issues of power and politics" (Hislop et al., 2000, p. 409).

In line with these studies, we examine in this chapter how networking practices are power-laden. We do so in the context of university-industry collaboration projects, which adds to the studies from Hislop et al (2000) and Swan and Scarbrough (2005). First, the main focus is on a network in which formal hierarchy between the different parties (industry, universities and funding agency) is absent, not an intra-organizational innovation which (as a consequence of that intra-organizational focus) concentrates on formal authority and hierarchy. In his work on public-private mega projects, Van Marrewijk showed how power relations are inherent to these projects (Van Marrewijk, Clegg, Pitsis, & Veenswijk, 2008), and how lack of formal authority

between parties can lead to the dilemma of control versus commitment and power plays (Van Marrewijk, 2005). In the university-industry collaboration projects under study here, a situation is created in which the different parties are mutually dependent but have no hierarchical ties to each other, which enables us to explore how participants have to resort to practices other than drawing from hierarchical position to get things done from the other parties.

Second, the study adds to Swan and Scarbrough (2005) and Hislop et al. (2000) in that the participants in the network come from different social systems. As a consequence the participants may not only have converging but also rather diverging goals, different discourses, orientations and understandings of the world. Divergent interests were shown to be important factors in the power relations in public-private mega projects (Van Marrewijk, 2005; Van Marrewijk, et al., 2008). Differences in goals, discourses and understandings are likely to lead to other challenges and barriers (Bruneel et al., 2010; Hall, Link, & Scott, 2001; Meyer-Krahmer & Schmoch, 1998; Siegel et al., 2003) than the networking within a single social system, such as the organizations as part of the commercial system.

Third, more than Swan and Scarbrough (2005) do, we further zoom in on what network participants *do* and explore this on the micro level. The approach toward studying power in networking thus differs.Our approach to power provides insight not only in the intricate and subtle actions of people when they network and enact power. By analyzing these actions from a structuration lens, it also builds an understanding of how structural resources impact on the actions of agents in/on their network. We thereby follow up on Swan and Scarbroughs (2005) plea for taking in more the contextual factors that impact networking practices.

Structuration theory and power

To examine how networking practices are works of power, we use the concept of power as discussed by Giddens within his structuration theory (Giddens, 1979, 1984). With this theory, Giddens aimed to bring together sociological accounts focusing on either collectivities or agents by theorizing the interrelation between agency and structure. The theory poses that social life is constituted by social systems. A social system has structural properties, which are rules and the distribution of resources. Rules entail the constitution of meaning (what things do or do not mean) and sanctioning of modes of conduct (what can and cannot be done). Resources are divided in allocative and authoritative resources: the first entail the capability to generate command over objects, goods, or material phenomena (control of natural resources, means of production, and wealth; Nicolini, 2012), and the latter the capability to generate command over

persons or actors (organizing activities, structuring space and time, coordinating actors, and influencing the way in which people perceive themselves and their conduct; Nicolini, 2012).

Social systems consist of a plethora of interconnected practices: "Social systems, however, amount to nothing more than a manifold of interconnected practices and their enduring cycles of reproduction" (Nicolini, 2009, p. 1413). The practice-nets as discussed in chapter 2 are constitutive of these social systems - in this current chapter we speak of social systems to stay consistent with Giddens' terms*. The reflexive monitoring of their own and others' conduct is essential to the engagement of people in social practices. This means that people have practical knowledge of the rules and possible deployment of resources, and are (partially) able to reflect on those through their discursive knowledge (Giddens, 1984). Through their engagement in social practices which in turn constitute social systems, people either reproduce these systems or challenge them. This results in the stability or transformation of the social system as a whole. This process is what Giddens calls 'structuration'.

Whittington (1992) classifies social systems into communal (e.g. religious), economic (e.g. industry), domestic (e.g. patriarchy), political, and intellectual systems (e.g. universities). See table 1 for an overview of Whittington's classification. We use this classification in this study to build a better understanding of how the practices of the researchers, industrial representatives, and funding agency officers are enabled and constrained by their context, and where challenges, difficulties and opportunities in the collaborations come from. We consider researchers as moving primarily in the intellectual system, whereas industry representatives form part of the economic system. We have chosen to classify the funding agency officers, the 'bridging' actors, as being primarily part of the political system, as the funding agency is an instrument for the governmental policies on science, innovation, and the development of the knowledge economy in the Netherlands. We say 'primarily' and 'mostly', because – as Whittington (1992) points out – people always move around in multiple social systems and are therefore influenced by multiple (sometimes contradicting) structural

* *In the previous chapter we spoke of practice-nets to indicate the intertwinement of networking practices with cultural, organizational, and professional practices. In this chapter we use Giddens' notion of social systems with certain structural properties (resources and rules). In Giddens' structuration theory, the manifold of interconnected practices constitute social systems (Nicolini, 2012). This implies that the practice-nets in which scientists engage belong to the social system of intellect or science, whereas the practice-nets of the industry representatives are part of the social system of commerce. The practice-net of the funding agency as third and facilitating body, we argue, draws its practices from both these social systems and the political system.*

principles. For the purpose of this chapter, we emphasize the social systems from which the diverse participants are most likely to draw in the context of the university-industry collaborations, i.e. scientists from the intellectual, industry from the commercial, and funding agency officers from the political system.

Table 3.1 Social systems and the structural bases for action. Taken from Whittington (1992).

Activity system	Communal	Economic	Domestic	Political	Intellectual
Dominant structures	Ethnic and religious	Capitalist	Familial	State	Professional and academic
Basic resources	Networks*	Capital ownership	Patriarchal authority	Legitimate coercion	Expertise and legitimacy
Basic rules	Solidarity	Profit-maximization	Paternalism	Patriotism	Professional codes
Organizations	Clubs and churches	Firms	Households	Executive, legislative, and judicial	Professional bodies and universities

* *These networks are different from the networks as discussed in this dissertation, as they are based on common social demographics.*

According to Giddens, power is a fundamental element of social systems and social interaction. Power is part of structural properties of social systems, enacted through social practices, and is thereby 'present' on both the structural level and the interactional level (Giddens, 1979). Structurally, power is present within social systems due to the distribution of resources. Giddens calls this the structure of domination. At the level of interaction the structure of domination generates what Giddens sees as an actor's capacity to 'intervene in events in the world', or more specifically, "the capability of actors to secure outcomes where the realisation of these outcomes depends upon the agency of others" (Giddens, 1979, p. 93). Giddens thus sees power not as a resource or 'static quantity' by itself, but as "instantiated in action" (1979, p. 91), with allocative and authoritative resources as media for the exercise of power. Power in Giddens' theory is not a zero-sum game. A dependent party ('subordinate') always also has resources to intervene and assert autonomy in relation to the parties on which they depend ('superior'). One always has some room to (attempt to) influence another, despite asymmetry of resources. Giddens calls this the 'dialectic of control'. Structures of domination are thus not only constraining, but also enabling.

Power/practice lens on networking

Structuration theory's notion of the relation between agency and social systems and specifically its notion of power lend itself well for the study of power in networking as a practice. Structuration theory and the practice approach fit well, as Giddens' ideas of social practices within his structuration theory lay at the basis of the practice approach (Nicolini, 2012). The practice lens enables the study of the actual activities and strategies of network agents in particular contexts (Manning, 2010). Because the approach looks at the details of everyday (organizational) life - 'the local, the particular and the timely' (Suchman, 2003) - it enables accounting for what is tacit, familiar and taken for granted, such as power relations (re)produced through practices:

> *...Anything people do bears intentional or unintentional implications for how they fit into the 'system', and its distribution of power and privileges....a practice based view of social and human phenomena is distinctive in that it...reaffirms the centrality of interests and power in everything we do.*
>
> (Nicolini, 2012, p.6).

Combining the practice approach and Giddens' notion of power will build an understanding of how networking practices are "a political endeavour involving negotiations between multiple actors" (Van den Brink, 2010, p. 29).

We define networking practices as "structurally embedded, dynamic, socio-political actions of people when they enter, build, maintain, use, and exit their relations at work". Networking is both the building or coordinating of connections with other people on the interpersonal level, as well as the utilizing of those connections through for instance knowledge sharing, money transfers, materials provision or lending, or personnel exchange. This conceptualization encompasses both formal networking, through formally required arrangements such as meetings, and informal networking between individuals.

Giddens' notion that power is inherent to social interactions implies that networking practices are inherently power-laden as well – though this is not to say that networking can be reduced to power alone. We examine networking as actions of individuals that are informed by the structural properties of the social systems in which the different actors are embedded. We explore how they engage in networking practices within a framework of rules and distributions of authoritative and allocative resources of the intellectual (science), economic (industrial), and political (funding agency) social systems (Whittington, 1992). In our case study of a university-industry collaboration project in the field of medical technology, we analyze how the (asymmetric) distribution of resources prompts networking practices between the project participants: they build

relations with others by deploying certain resources to obtain resources from them, and thereby (try to) secure outcomes for which they are dependent on those others. Individuals thus network to transform or reproduce the distribution of resources. As such they engage in the 'dialectic of control': through their networking practices they manoeuvre between dependence and autonomy in relation to the other parties involved in the collaboration. In the process, they deploy structural rules that 'guide' their behaviour. These rules are structural properties of the (different) social systems in which the scientists and industrial representatives are embedded. This notion of power enables us to gain insight in how power as a relational concept is enacted through networking practices in the context of university-industry collaborations. We will now turn to how we have gone about studying this.

Research design

To examine networking practices within university-industry collaboration as works of power, we used the practice approach as research strategy. This specifically means that we collected data from and analysed in-depth the course of MediPro, an ongoing university-industry collaboration project in the medical technology field. Using the practice-based approach requires interpretative and qualitative methods that enable the examination of actual 'sayings and doings' of individuals (Nicolini, 2009; Yanow, 2003). We therefore combined the methods of observations, interviews, and document research in our case study, which helped us to gain an in-depth and comprehensive insight of the project proceedings and specifically of the networking practices that were engaged in by participants in the collaboration project.

Case: MediPro

MediPro was an (ongoing) project funded by a Dutch government-based funding agency. The agency played an important role in the establishment and formal course of action of the project. Generally, this funding agency aims to stimulate the development of new scientific knowledge and technologies applicable in industry, by facilitating cooperation projects between universities and commercial and non-profit organizations (called "users", referred to here as industrial representatives). In the projects, the industry representatives are informed by scientists about the scientific progress of projects through half-yearly meetings which are formally required by the funding agency. Broadly, many industrial representatives come to listen and learn, others ask critical questions during meetings, some do measurements together with scientists on own products, or develop products (mostly together with students). The latter

is the case in MediPro.

Table 1 provides an overview of the project members. To keep the participating organizations and persons anonymous and non-traceable, we discuss the topic and products in the project only as much as is needed for an understanding of the case description. As it was initiated and developed by scientists, the project was predominantly science-oriented, and industrial representatives were mainly involved to provide input for the set-up of a measuring system, which would then be used for the actual scientific goal of the project: to enhance the diagnosing of specific types of diseases. The goal of MediPro was to build an innovative integral system for diagnosing patients via MRI scans on those diseases and then perform patient measurements to gain insight in and improve the diagnosis of those diseases – which was the scientific part of the project. This system required input from and cooperation with different industrial representatives, without which the scientific part of the project was not possible.

We selected MediPro because within this particular project the industrial representatives were assigned specific collaborative tasks that were essential for a successful course of the project. Additionally, we noticed during data collection and earlier analyses that all parties in this particular project tried to achieve their goals by engaging in political manoeuvres. During the data collection we found that the participants in this project encountered several set-backs and barriers that inhibited the progress of the project and how they participated in power struggles, which we studied in-depth to build a better understanding of how the different participants' networking practices were intertwined with those struggles and were engaged in to render the collaboration effective. A measurement tool eventually emerged from the collaboration, though with great delay, causing the scientific results to be delayed as well, to the disadvantage of some (early career) researchers. From a survey at the end of the data collection we learn that many participants mention the slow technical progress and unsatisfactory collaboration between researchers. Almost all participants thought the objective of the measurement set up had been partially accomplished, yet the scientific part was at that stage underdeveloped.

Table 3.2 Overview of involved parties and affiliations MediPro

Involved parties	Name	Organization
Project leader*	Jane	Academic hospital A
Fellow applicant	Kirk	Academic hospital A
Fellow applicant	Esther	Academic hospital A
PhD student*	Alexandra	Academic hospital A
Involved: technician	Burk	Academic hospital A
Involved: technician	Lawrence	Academic hospital A
Fellow applicant*	Evy	Techn. Uni. A
Fellow applicant	Wayne	Techn. Uni. A
PhD student*	Cecile	Techn. Uni. A
Fellow applicant	John	Techn. Uni. B
Postdoc	Stan	Techn. Uni. B
Master student	Danny	Techn. Uni. B
Program chair	James	Techn. Uni. B
User*	Thomas	Technical device
User*	Peter	Measuring system A
User	Louis	Measuring system A
User*	Frank	Software comp
User	Henry	Measuring system B
Program officer*	Melody	Funding agency
Management assistant	Cindy	Funding agency
Involved: professor	Denise	Academic hospital B

* *Interviewees*

Data collection

To collect data, we conducted observations, document analyses, and interviews.

Observations

One of the requirements of the funding agency for each project is to have meetings every six months with all scientists and industrial representatives involved. However, in MediPro, the requirement of half-yearly meetings was kept only in the first year. After that, meetings were held once every year. The first author conducted observations of two meetings of the project. They lasted three to four hours, including lunch. The location for the meetings was the Academic Hospital A (AcaA), the location of project leader Jane and PhD student Alexandra, and the centre of the project. It was the AcaA where the different developed products were brought together into a complete system

and where data were to be collected through patient measurements (due to the presence of an MRI scanner and AcaA being an academic hospital). In these meetings, the scientists presented their activities and discussions arose between the scientists and with the industrial representatives. The emphasis during the meetings was mostly on the activities and output of the researchers: they were given the most room to present and discuss their progress.

During the meetings, the observing researcher sat at the conference table with the participants. She either used a laptop or a notebook to record as much as possible of what was being said and done – before, during, and after the meetings. Due to the confidential nature of the meetings, it was decided not to record the meetings on camera or tape. The researcher arrived early, before most participants arrived, and lingered after the meetings had finished, to be able to record the socializing and informal networking that went on in and around the meetings – including where the participants were seated and what the room looked like, with whom they talked, what their input was during the meeting, who made jokes with whom, who looked at or whispered with whom, who interrupted others and who were silent.

Documents To understand the initiation and course of the project and examine the reasons individuals had to participate in the projects, we studied the official documents related to the project: the application document, minutes, progress reports, and continuation report.

Interviews Additionally, we held interviews with eight key members of the project, as shown in table 1. We interviewed the project leader who was a clinical researcher at Academic Hospital A (the central player in the project), the funding agency's representative program officer, a fellow project applicant from Technical University A, two PhD students, and the three main industry representatives. The interviews lasted between 45 and 75 minutes. Respondents were asked about the general goals of and their personal goals in the projects; how they got involved; what they thought of the progress and how it could be improved; what the role of the different network participants were, including their own; how they would describe the nature of relations within the project group; and what they thought 'networking' means.

Analysis

To gain a picture of the project as a whole and the practices within it, we started the analysis with drawing up a reconstruction of the course of the project on the basis of the documents, interviews and observations (a "thick description", Woodside & Wilson, 2003). This reconstruction was focused on the networking practices done in the case between researchers, industrial representatives, and the funding agency officer. We approached networking practices as both the

new connections made between people and the use of connections through sharing knowledge and resources.

From this reconstruction of the process of the project we identified four networking practices that participants engaged in within situations of difficulty, friction or conflict to which the participants needed to respond. These practices are able to illustrate well how participants engaged in the enactment of power through those networking practices. First, we found that the networking practices of participants in the stage of the set up of the project were power-laden: the in- and exclusion of collaboration partners (networking practice 1). After the project started, collaboration and resource exchange were enabled as researchers tried to engage the industry representatives through 'people management' to get things done (networking practice 2). Additionally, researchers interfered by 'refitting relationships' when an industry partner could not meet his promises (networking practice 3). We furthermore found that the program officer of the funding agency had trouble finding ways to enact power in her facilitating of the network and resorted to networking to try and influence the project network (networking practice 4).

We analysed these networking practices asking how these practices enabled the doing of power. In the analysis we were aided by Giddens (1979, 1984)'s notions of transformative capacity, rules and resources and dialectic of control (the dynamics of agents' mutual dependence and autonomy). We asked the following questions in the analysis: What resources do the participants seek to gain from these networking practices? What resources do they deploy in their networking practices? What rules guide (constrain or enable) their networking practices? How do participants seek to intervene and get things done through their networking practices? We will now turn to these analyses.

Findings

Drawing from the observations, interviews and document analyses, and with the help of the theoretical framework based on Giddens' structuration theory, we now analyse how the participants of MediPro enacted power while engaging in the four networking practices: in- and excluding partners; engaging industry; refitting relationships; and facilitating the network. For each practice we discuss the situation at hand (e.g. a tension or conflict), the networking practice in which certain participants engaged within that situation, how power was involved in that practice, and the rules and resources that steered the networking practice.

Starting up: in- and excluding partners

To begin with, to participate in university-industry collaboration the researchers were guided by three general rules of modern science. The first rule was the scientific rule of gaining funding for research: scientists are more and more urged to go to industry to get money for research. The second rule was the growing importance of economic and social value of science, or 'valorisation' as it is called in the Netherlands: to ensure the usefulness of scientific research for industry and society at large. These two rules originate from the political system as it is the Dutch government which determines how public money is invested and which shapes innovation and science policies and climate. A third rule was the rule of efficiency, to tap from the knowledge and materials needed by the researchers that were already present within several industrial companies. These rules steered the researchers to apply for project funding by the funding agency under study.

Besides the general rules of the scientific system, the researchers in MediPro were also steered by the rules of the funding agency to include formal industrial partners to get the project accepted and funded. Before the scientists could submit their project proposal to the funding agency, they had to find industrial partners who were willing to take part in the project. In the process of including industry partners, Technical Device and Measuring System A were chosen as they were already in the networks of the researchers through previous collaborations. The nature of their relations with the partners was a guiding principle: these prior existing relations were relevant resources as they had already proven to be useful. The researchers had prior knowledge on the competences and trustworthiness of the partners, as well as a feel for the ease of communication with the partners and included partners accordingly. Two other partners, Measuring System B and Software Comp, were asked by the project leaders to join the project after a meeting organized by the funding agency that had the goal to introduce researchers and potential industry partners to each other. In the first months of the project, however, the issue arose that Measuring System A was able to provide the same product as Measuring System B, yet in a more advanced state. It was decided by the researchers in consultation with the industrial partners to go for the more advanced product of Measuring System A and not get Measuring System B's input from the project – with its representative's consent, or as Alexandra, one of the PhD students, said: "*So we basically tactically put him aside*". In this situation, the rule of efficiency on the scientific side took precedence over the rule of scientists seeking to network with new industrial partners for product development and learning. Agreeing with this decision, the representative of Measuring System B diminished his ability to influence the course of the project and gain resources

from it. Formally the company was still involved, but the representative did not attend subsequent meetings and no substantive contact was kept after the decision to prefer Measuring System A over B. Informally, this industry partner was thus excluded from the project network.

In this networking practice of in- and excluding partners, we see how power is done in different ways. First, the funding agency enacted power to influence the network of project MediPro - and other projects that were part of the same larger program - by facilitating a network meeting. As the funding agency, part of the political system, is a key distributor of the most important resource for scientists – public money - the agency has autonomy and formal authority to demand certain procedures and apply instruments for steering the university-industry networking. Yet, as a result of the set-up of the collaborations (the focus on scientific research; researchers writing and applying the project proposal), the researchers were the ones to have the formal authoritative power to actually decide upon the selection of industry partners. Interestingly, it was with the two industry partners who were included after the funding agency-initiated meeting that participation never materialized into effective collaboration. So although the funding agency influenced the project networking through facilitating such a meeting, its rules and resources made it so that the actual ability to decide who would enter and participate in the project lay with the researchers who were the project applicants.

We see power enacted through this networking practice in a second way. Within the constraining rules of the funding agency, the scientists had the autonomy to make the inclusion decisions. By deciding upon who enters the project and who will actively provide input, the researchers significantly enacted power to influence the direction and proceedings of the project. Researchers initiated and designed the project and chose which industrial partners to include. The transformative capacity of the companies consisted of their consent to participate, promises made to deliver the resources on which the researchers depended, such as money, knowledge, materials and time, and their power over the development of the products. This indicates a mutual dependence, in which the researchers depended more on industry for resources than vice versa. Yet, as the notion of the dialectic of control (Giddens, 1984) indicates, an agent is never completely dependent on another agent, but always has the room to resist or assert (a certain level of) autonomy through its own agency. In this case, being the ones to select the industry partners to be included in the project, it were the researchers who had the ability to gain control over the nature of the resource exchange in and the subsequent process of the project. Though they depended on the industry partners, in their inclusion choices they were

able to steer and somewhat resolve that dependence.

The including and excluding practice is the first practice to bring science and industry together in the context of a university-industry project, and is prompted by the interests of the different parties. We see that the structural properties of the intellectual, economic, and political systems informed the relations of dependence and autonomy between the parties in the projects – the scientists, industry representatives, and funding agency. The structure of rules and resources as determined by the funding agency (political system) enabled and steered this networking practice. As such, the agency practiced power as well. The practice of in- and excluding partners is socio-political as researchers needed to 'tactically' select which partners to include so that their interests were best and most efficiently met. We see that within the project, the authoritative resources (deciding upon partner inclusion) lay mostly with the scientists, whereas a large part of important allocative resources (money and products) lay with the industry partners. The industry representatives were able to exert power as they possessed resources on which the researchers depended. Yet, as they had less ownership and less urgency for the project, as we will see in the next section, they enacted less influence on the project than the researchers.

Engaging industry

In the period around the second general project meeting and before the third meeting, several industry representatives had little time to spend on the project and the researchers were waiting for their contributions: "*the work is sometimes at a standstill. So that's a problem…"*(Cecile, PhD researcher). This "standstill" was a problem because the structure of the collaboration rendered the scientists to be dependent on the industry's input: the PhD researchers and the project as a whole were dependent on the development of the products within the companies for being able to conduct their research.

A possible explanation for this limited input of industry partners in this period is that a lack of ownership and urgency existed among industry. The initiative and project design were mostly the responsibility of the researchers, which seemed to influence the feeling of ownership as the following quote of one of the industry representatives illustrates:

> *I can still remember this clearly: at a certain point during one of the meetings, signals were presented, and I said to the researchers, 'I see things happening here that in my experience can never have been measured with our [instrument], so that has to be [noise]'. Well, that was resisted at that moment, afterwards it turned out that I was right. But yeah […]if the researchers have a different opinion, well that's it then [...]And eventually they decided to continue from there [..]I didn't think at that time it was a good idea, but well, it's not my project. So I tell them what I want to tell, and if they then make a different decision, well, so be it.*
>
> [Peter, Measuring System A]

This happened in an early stage of the project. The quote points to how the industry representative experienced his room to influence the project as limited due to the researchers' behavior. His advice was ignored and his expert knowledge neglected. This quote suggests that he did not feel he had the power nor feeling of urgency to press his opinion and illustrated how the scientists (in his eyes) (re-)asserted their autonomy – thereby undermining his expertise. He did not identify as an owner of the project and distanced himself from the project and this decision, leaving the consequences for the researchers. So even though this representative was included as an active contributor for the project, due to informal power-laden behaviors of the researchers his ability to make an impact was limited here, as were his sense of urgency and ownership.

Second and more important reason for this lack of ownership and urgency is that the rules and resources of the industrial companies constrained the representatives' input and agency within the project. The industry's input was limited by the industry rule that commercial and exploitative activities are prioritized over exploration and innovation development. The issues of the day constrained the representatives' time for the project, as did the hierarchy that impacts their time allocation:

> *…It's hard to say, set a precise date. Because they say, the boss determines how much time we get for this, and other things keep coming up.*
>
> [Cecile, PhD researcher]

This quote points to how the hierarchy of a representative's company was limiting his input, something which made it hard for the researchers to make strict demands. Peter of Measuring System A joked about this 'universal' issue of 'the boss decides' during a general project meetings (see page 50). These quotes show how formal authority structures in the industry companies impacted the project indirectly: the resource of time needed was (at that time) not available for the representative. It also indicates the inability of the industry representatives due to their position in their own organizations to change that. The researchers were hence indirectly depending on the economic practice of organizational hierarchy.

The researchers, however, needed the representatives' input, which made them perform the networking practice of engaging the industrial partners to keep them involved in the project. As a result of how the projects were set up

by the funding agency and the general practices of the scientific system, the PhD students were responsible for the sub-projects making up the larger project and for gaining input from the industry. As such, they were 'gatekeepers' and the first to feel the need for action when the contributions of the companies were delayed. It is these PhDs who took the initiative to maintain contact with the industrial representatives, by visiting and calling them. They called this practice "*people management*":

> *I call them often....I make sure I stay in the picture. And ... I like talking to people, it's fun and all. And then often I have a bond with a person and on the basis of that, it's easier to call someone.*
>
> [Alexandra, PhD student]

The two PhD students hence engaged in social networking to gain more visibility and "stay in the picture", and to eventually get more time and priority within the industrial companies.

Through this practice, power is performed. By calling often and bonding informally the PhD researchers tried to convince and push the industry to get involved more and get things done for the researchers. These informal relations would ease the collaboration with industry and enable the PhD to ask for input. How successful Alexandra was in this networking practice was shown by her being the first contact person for Peter, the representative of Measuring System A, who in one of the meetings referred to the researchers as "*Alexandra and co*". The PhD students had no position to demand time or finished products from the companies. Yet they found a way to enact transformative capacity within these limiting parameters. As such, they manoeuvred within the dialectic of control and solve their dependence from the industry partners. Communication skills became resources for transformative capacity here. Having regular contact to stimulate industry representatives to act was perceived by them as a way to influence the course of action. Relations were used as a resource for the project: good social relations were believed to enable effective instrumental relations.

It is noteworthy that the funding agency's program officer is not mentioned in this regard, nor did she herself show initiative or knowledge regarding this networking practice. The networking practice of engaging industry was therefore not tripartite but dyadic, i.e. between researchers and industry. In the section on 'facilitating the network' we explore why this may be the case.

From the analysis of the practice of engaging industry we can conclude that researchers' power-laden networking practices do not only come from a position of relative autonomy - as in deciding who is included in the project -

but also from a position of dependence. It is the structure of the collaboration that makes them dependent on the industry, and it is the practices and formal authority structures of the companies that limited those representatives' room to provide input. The PhD researchers, not having the formal authority due to their lower hierarchical position within the scientific rules of hierarchy, were not in a position to coerce or demand, and therefore had to resort to techniques of social relationship building to get things done from the industry. Informal relationship building is thus used as a tool to serve certain parties' interests.

In the following section we discuss an instance in which the input of the industry did not follow up on his promises and the relationship between the particular industry partner and researchers was at risk of waning.

Refitting relationships

The third networking practice we discuss is the 'refitting' of relationships. With this we mean, first, the practice of replacing someone with another person to get a task done in case the first person is not able to do so. A second form of refitting, in the sense of repairing, is the re-evaluation of a relationship to try and repair that inability to do that task. The situation in which we saw participants engage in this practice is as follows.

During the long process of developing the different parts of the measuring system and putting those together, Software Comp encountered problems with their part of the project: the development of integrative software. This software was supposed to bring together all the data gathered through measurements in the project. Yet, as its representative, Frank, explained during the third general project meeting, problems existed with the capacity of the company's software to cope with the big amounts of data that needed to be synchronized and analysed. Until recently, he had not had the resources (time, money) to develop a solution for the problem nor did he have the autonomy to change that position. Now, a new department in his company was set up to free up people to work on these kinds of projects. He blamed himself (*"[I] more or less neglected it", see excerpt below)* but also pointed a finger at his company, attenuating his own blame. According to Frank, it were the organizational hierarchy and power relations that constrained his resources, room to act and his ability to provide input and be of use for the network. Within the limits of that hierarchy, as a rule, his boss determined the time and money to spend on the project. The lack of status of the representative limited his opportunity to change the priorities of his company and restricted his contribution to the project. It was not until a new department was set up within his company, providing new intra-organizational practices for innovation development by the company, that the representative was actually actively able to do something about the situation.

However, that was too late for this particular project. The representative did not solve the problems and let the issue linger, because he did not have the power to provide solutions.

The researchers responded to this issue in two ways of 'refitting relationships", as they developed or worked on certain relationships to make sure this issue would not (further) halter the progress of the project. First, they expanded the project network by bringing in a technician from the AcaA internally, who was able to solve the problems with the required software. Expanding the network in this way gave the researchers the resources to continue with the development of their diagnostic system, which was critical to the progress of the scientific part of the project. Expanding the network was a political move through which the researchers enacted power by taking back control over the project's course. By finding an internal expert to help out with the software problem, they decreased their dependence on the software company and hence enacted transformative capacity regarding the course of the project.

The second response of the researchers to this situation was that they refitted their relationship with Frank by re-evaluating the relationship publically and sanctioning his inactions. During the third project meeting, one of the senior researchers evaluated the situation and the representative's role in the project and reprimanded Software Comp:

> *Kirk, a senior physicist involved in the project, critiques Frank's contribution to the project: "we waited for your company for two years, you promised to work on this, but that never happened". He explains how they found someone within the university to solve the problem, and "we have had means to deal with so much data for a long time already, indicating how the company is lagging behind." Peter, representative of Measuring System A, adds that his company also has such means ready and waiting. Kirk asks Frank, "Why then would your company want to participate in such a project?". When he is finished with his speech, Frank responds: "I need to take the blame for this", as the means and priority were not present within his company, and the researchers had already said the other person within the university was able to do it, so he "more or less neglected it." Jane, the project leader, then asks what contribution his company can make for the project. It is suggested that the researchers and the representative should meet later to discuss this. Frank agrees, and the moment passes.*
>
> [Observation, general project meeting]

This is a practice of networking as the continuance and use of the tie between the researcher and this specific industry partner are under discussion. The protagonists in this excerpt are explicitly working on their relationship.

We see here how power is done through the evaluation of the use of the relationship, which is an action aimed directly at this specific tie between the representative and his company and the researchers. The discussion consisted of the physicist using his position as senior researcher and fellow project leader to address the industry representative, pushing that person on the defensive. The senior researcher accused the representative of neglecting his tasks and appealed to the representative's accountability for the problematic course of this part of the project. Then, he took control over the discussion by questioning the participation of him and his company. By posing this as an open question to the representative, he simultaneously questioned the input of that partner and provided an opportunity to mend the relationship and make it useful for the project. The reprimand (a way of sanctioning) is a direct doing of power and created a temporary asymmetrical power relation. At the same time, we see the social mending of the pain caused by this reprimand, and the minimization of loss of face of the industry representative as the physicit mainly refers to "your company" instead of referring to the representative personally.

It is noteworthy that it was not the project leader who gave the reprimand, but one of the fellow-applicants, Kirk, a senior physicist. This may have to do with the identity and authoritative resources of the different players: Kirk had a high position and the authority as one of the fellow applicants of the project, and used this position to give a reprimand. The project leader took a coordinating role and positioned herself as an intermediary, trying to explore further continuation of the relationship as she asked how the tie could potentially be materialized in the (near) future. She mitigated the situation by proposing to explore what the company could still do for the project. This was in line with her role and responsibility during the whole meeting, which was bridging the two worlds and finding middle ground whenever solutions were sought after.

Again, in this situation the role of the funding agency seemed non-significant. During the discussion on the issue, the program officer remained in the background and did not exert any influence on this situation.

In this practice of refitting relationships, we see, first, the dialectic of control in action: the dependence of the researchers on the industry is resolved through networking within their own organization. As a consequence of their practice, the autonomy of the researchers is (re-)asserted. We see here how authoritative resources are both constraining (hierarchy in industry, the non-hierarchical nature of the network) and enabling (researchers deciding upon including intra-organizational agents, the ability to reprimand). Power over process (inclusion in network, inability to change intra-organizational processes) seems more important in this situation than power over material resources - which in the course of the project turned out to be present in multiple locations.

Facilitating the project network

The previous networking practices mostly centred around the researchers and industry representatives. We now turn to Melody, the program officer, who engaged in her main practice of facilitating the project network as representative for the funding agency. As we noted in the previous sections, except for the inclusion of partners she appeared to be much less involved in issues that had to do with the actual deployment of relationships between those two parties. Indeed, Melody said about this:

> *It is of course rather difficult [to have] actual possibilities to intervene. [...] we are not the decision makers, we are indeed supportive, we look on, we can give advice. But if you really do not agree with something, you do have to search for grounds on which you have the right to speak, so to say. [...] That's why you kind of have to conquer your role a little, because per definition you have that role. If you are like the chair of something or the director, then people just need to listen to you. And now it really [depends on] how they see you [...] but that is kind of inherent because the function is not extremely clearly defined in the meetings.*
>
> [Melody, program officer]

The program officer positions herself here as relative outsider (an 'onlooker') in the network. Because of this relative outsider position, she had difficulty establishing a clear role for herself in her projects and doubted her power basis to make demands towards the project leaders and others - for instance, at one point during the interview she uses the phrase "*Who am I to [interfere]"*. She identifies herself as a more passive subject in the project, using words as supportive (in contrast with being instrumental) and looking on (instead of actively participating). Using the term 'we', Melody refers to the general function of 'program officer' in the funding agency and from that derives her identity and limited role in the project. She claims to miss the resources ("*grounds"*) to interfere, which are formal authority and position in the network - not the chair or director, not a decision maker. As such, she feels to not have the legitimacy to have a say and impact on the networking done in the project. This results in a struggle to 'conquer' a legitimate position in the group, a straightforward power doing. She constructs her influence to be dependent on the participants' perception of her role and puts her potential authoritative power in their hands, thereby weakening her autonomy and authority as funding agency officer. This self-positioning is the result of the structure of the collaboration, with scientists being the project leaders and thereby having the formal authority to decide, and the result of her rules of conduct being vague to her. As a consequence, she has trouble finding authority and room to interfere in the project course.

During observations we noted how this program officer within her perceived limits tried to stimulate the network to move forward: she tried, for instance, to convince the project participants to move faster in the development of the measurement instrument and encouraged the researchers to start measurements soon. Trying to push for actions to be taken, trying to control the meeting's proceedings, and persuading the participants to give insight in the progress of the project, she enacted, or tried to enact, power to impact the participants and the progress of the project. In these attempts to steer the project network, she was sometimes confronted with small acts of resistance. She, for instance, was interrupted and overruled by senior researchers during one of the project meetings:

> *When post doc Stan is done with his presentation, the question comes up whether one of the industrial representatives will now give his talk. Melody, the program officer, proposes that indeed the representative takes the floor, but she is overruled by James, the leader of the program in which this project is embedded: "let's first present the entire project, then the companies can get the floor." Kirk, the other senior researcher, agrees with this: "yes". The program officer blushes, looks embarrassed, and lets the meeting proceed as the researchers insisted.*
>
> [Observation, general project meeting]

Here we see in practice the struggle of which the program officer spoke earlier: in her attempt to influence the network process in the meeting, her input was played down and her position in the group undermined by two men senior researchers. The authoritative resources of these senior researchers in this setting thus outweighed her own formal authoritative resource as funding agency representative. The officer constructed herself as having no legitimacy to interfere, which is reinforced by her being sanctioned socially if she tries to interfere, as the instance shows.

Though as a representative of the funding agency Melody did not enact much power in the project process itself, she did derive some autonomy from the funding agency's formal procedures. In particular, she noted how her possibilities for interference were limited except for the opportunity provided by the continuation decision. This decision is a requirement established by the funding agency: after one and a half or two years, industrial partners and the funding agency's officer need to determine whether they are satisfied with the progress of the project, and whether they continue the support for the project.

> *The continuation [decision] is a moment where you have actual power, so to say...*
>
> [Melody, program officer]

We see here an instance of manoeuvring within the dialectic of control present in the project: through deploying the instrument of the continuation decision, the program officer has the opportunity to regain some autonomy and formal authority to impact on the network's course. The continuation decision provides the program officer with the potential resource to "*have actual power*" and influence the process of the project. It is with this decision that the dependence of the researchers on the support of the funding agency and the industry partners is brought to the fore. However:

> *[S]ome take seriously what I say and think it's really important whether I approve the continuation, and others feel differently about [the approval].*
>
> [Melody, program officer]

This dependence of the scientists on the officer is nuanced by Melody herself as she frames it as an 'advice' and as something that project participants can choose to take seriously or not. In her construct of her own position, whether the effect of her position of power as a potential decision maker on the continuation (and hence the money flow) works thus depends on how the others in the project perceive it. The extent to which the program officer can make use of this potential instrument as a resource for power is therefore constrained. She finds herself, again, dependent on the nature of her relationship with the project participants.

In this practice of facilitating the network, we see the dialectic of control at work: scientists depend on the funding agency for money, and the funding agency depends on the scientists and industry representatives for reaching the agency's goals. The funding agency possesses the resource of money on which the participants - especially the researchers – depend. Through the abovementioned practices that underplayed the power of the officer, however, the impact of the funding agency on the university-industry networking had boundaries. These boundaries lay with the formal allocative resources the agency provided (money) and the rules and procedures it set up as a condition for money granting. On the interpersonal level, through the structure of the collaboration, the self-positioning of the program officer, and underplaying practices, autonomy was given to (and taken by) the scientists, and the program officer reasserted her dependence on the other project participants. We saw that the power the officer could exert on the basis of her formal authority as funding agency representative was further weakened by the practices of the scientists that made them more autonomous and underplayed their dependence on the funding agency. Her outsider position construed both by her and the other participants limited her perception of power and actual enactment of power in the facilitating of the

project network. The continuation decision is a potentially good instrument as a resource for power of the funding agency and has potential disciplinary power. Yet, this may only work if this instrument has legitimacy and if it is perceived by project participants as a serious potential sanction.

Discussion and conclusion

In this chapter we aimed to build a better understanding of how networking practices in university-industry collaborations are works of power. For this purpose, we combined a practice approach and the critical diversity perspective through the conceptualization of power as laid out by Giddens in his structuration theory (1979, 1984) to the study of networking practices. We applied this approach to a qualitative case study of a university-industry collaboration project in the Dutch medical technology field. The practice perspective enabled us to put power centre-stage within the study of the 'work' that project participants put in their networks, i.e. what they do when they build and use their relationships with others. This has provided us with four theoretical contributions.

The first contribution is conceptual and entails incorporating a relational conceptualization of power in the study of networking practices. The other three contributions are contextual and to literature on the field studied in this chapter, i.e. university-industry interactions: how power 'works' within university-industry collaborations; how university-industry networks are informal hierarchies; and how power and trust coexist in networking. The chapter furthermore inspired us to explore the idea of a 'third space' in university-industry collaboration as a practical implication. We round up this discussion section with the conclusion.

Conceptualising power in networking

In contrast to studies that examine power in networks from a structural/positional (and hence, mostly static) perspective, we provide an alternative conceptualization of power in networks. We contend that it is also interesting to examine networking through a relational conceptualization of power, come about through a practice lens. We learned that a relational conceptualization of power helps to gain a different perspective on how networks and power intertwine. Power is enacted when a person, through the building of a relationship, deploys a resource (e.g. knowledge, function in the group, prior relations) to gain resources and get things done from others. Power is not derived from network position, but it is performed through networking practices, the exchange of resources and application of rules.

The study showed us how resources (among which network positions)

are actually used in order to exert power within a network, and how that influences network formation and development (who is included or not), the use of network ties (who contributes what to the project), and the quality of relationships (e.g. are promises kept). Structural power/network studies treat power as endogenous, i.e. coming from within the network. This study taught us that networks are actually the result of the interaction between available structural resources and what people do with them, which – following Giddens' notion of power in structuration theory - inherently involves power. Power thus 'flows through' a network because of the networking practices of network members - it does not 'sit' statically in positions.

The relational conceptualization of power allows us to respond to Swan and Scarbrough (2005) plea for more consideration of the role of broader context and institutionalized systems in the study of networks and power. We learned that structurally available rules enable but also constrain networking practices. In the case of university-industry collaborations, for instance, these are the growing emphasis on the social and economic value of science, practices of science, and practices of the economic system. Within the powerful rules of innovation and commercialization, scientists and industrials resort to particular networking practices to get the resources they need, e.g. knowledge, materials, products, time, or money. As a result they bridge social system differences and make their collaboration effective, for both the common goals of the project and their own (divergent) goals. We learned that parties or people are included or excluded in a network due to rules of efficiency, hierarchical constraints, or rules of the economic system that prioritize day to day activities. Industrial partners, for instance, lacked the time to bring necessary input to the project, and hierarchy impacted the abilities the PhD candidates had to gain input from the industrial representatives. This teaches us that networking practices are not idiosyncratic practices, emerging from people's free will and strategic behaviour alone, but are firmly constitutive of and entrenched in social systems, in both productive and constraining ways.

Applying the relational conceptualization of power in networking to the case has allowed us to make contextual contributions to knowledge on university-industry collaboration: a general contribution regarding *power in university-industry collaborations*, which brought us specific lessons regarding *networks as informal hierarchies*, and *trust and power*. We will now explain each of these contributions.

Power in university-industry collaborations

Our general contextual contribution is building knowledge on 'high-involvement' relationships and 'non-codified knowledge channels' within university-industry collaboration, which is relatively underdeveloped (Gernter et al., 2011; Bruneel

et al., 2010; Perkmann & Walsh, 2007). Prior studies have often examined university-industry collaborations through patents or co-authorships (Perkmann & Walsh, 2007), which can provide insight in larger patterns of knowledge transfer and innovation development. Micro-level data on these collaborations is scarce and little systematic effort has been made to explore university-industry interaction processes in-depth (Thune, 2007). Studies focusing on obstacles to these collaborations identified categories of barriers (e.g. Bruneel et al., 2010; Siegel et al., 2003), but did not study how barriers provided challenges and opportunities for university-industry network participants in actual practice, and how they dealt with those. Our relational conceptualization of power in networking practices enabled us to gain an in-depth insight in high-involvement relationships in which scientists and industry need to collaborate, obstacles they encounter therein, and how these parties dealt with those. From this we learned how power is inherent to university-industry collaborations.

We built an understanding of how university-industry collaborations are informed by relations of power: it is the organization of the collaboration in combination with the informal networking practices of participants that determines who can practice power to get things done for themselves and get their interests prioritized within such a collaboration project. Scientists are dependent on industry for allocative (material) resources and are dependent on the funding agency for money, but they are enabled to steer the process by the authoritative resources they gain from the set-up of the project. The industry seems relatively autonomous, as the project is not essential to them (which can hinder their participation, as the case showed) and because they have the allocative resources which the scientists need. Hierarchy and other practices from the economic social system in organizations plays a constraining role on ability to exchange resources and use ties in university-industry collaborations. The funding agency is relatively autonomous because they possess money due to which they can make demands, but due to the self-positioning of program officer further influence of the agency on the project's progressions was limited. We thus learned how the different involved parties are enabled and constrained by resources and rules from their respective social systems, and how this steers them to manoeuvre in a relationship of mutual dependence and relative autonomy. These relationships, as we saw, are not static: participants worked on their relationships to diminish or resolve dependence on others and assert autonomy, and as such relations of autonomy and dependence changed in the course of the project. With this we uncovered how the dialectic of control works for university-industry collaborations.

This general contribution of studying power in these 'high-involvement' collaborations has provided us with two specific lessons: first, how university-

industry networks become informal hierarchies, and second, how trust and power co-exist within university-industry collaborations.

Networks as informal power enactments

We address first the alleged equality and non-hierarchy of university-industry collaboration networks. Though formal hierarchy exists *within* the different parties (industry, universities, funding agency), there is no formal hierarchy *between* these parties in the collaboration networks. In their study of the early phases of intra-organizational implementation of IT-based innovation, Hislop et al. (2000) showed that the degree of exercise of formal authority was mediated by intra-organizational politics and networking. Networks thus impeded the formal hierarchical structure of the organization to work optimally. Based on the relational conceptualization of power in our study of a university-industry collaboration, we contend that the opposite can also happen: though formally a network is seen as non-hierarchical, we saw how in a situation of lack of formal, hierarchical resources for power between the diverse parties, participants engaged in informal power enactments. The self-positioning of network participants, the organization of the network, and the structural resource distribution which informed the dialectic of control (i.e. relations of autonomy and dependence) helped to construct what we see as an informal power enactment – with the funding agency framing the network processes through its procedures and rules, scientists steering the large part of the project and network processes, then industry, and then the program officer as representative of the funding agency.

As such, we learn that the organization of university-industry collaborations brings about a disciplinary power (Giddens, 1984) informing how and why people build relations with one another. In the collaboration project under study, for instance, the way the funding agency had set up the requirements and procedures for the money granting and projects enabled but also constrained how the researchers and industry representatives were brought together and developed relationships. In that constraining frame, a collaboration network becomes dynamic and is propelled forward due to participants' networking practices. These practices enable power relations to shift and make some people less dependent from others, or enable others to be included or perhaps excluded from collaboration, or grow or decrease a person's ability to interfere in network processes – as we saw with the program officer. As such, networks entail dialectics of control: people work on their ties to resolve dependencies from people they are dependent on, or to assert more autonomy. Because they are not involved with each other in a formal hierarchical power relation in the collaborations, people need to build relationships to get things done, and as a (unintended) result seem to engage in informal power enactments.

Power and trust

We also want to address the notion of the importance of trust in university-industry collaboration networks. Literature stresses that informal relationships and the building of trust between scientists and industry representatives is essential to successful knowledge exchange in university-industry collaborations (Hemmert, Bstieler & Okamuro, 2014; Bruneel, D'Este, & Salter, 2010; Gertner et al., 2011; Braun & Hadwiger, 2011). Yet, the role of power in these collaborations has been given less attention. Exploring a university-industry collaboration via a relational conceptualization of power, we learned that trust is not the only characteristic of these relationships important for how the relationships developed and were deployed: the study showed how trust in a network co-exists with power. The practice of inclusion showed that although parties are included in a network based on a certain degree of trust, this is done with certain interests in mind, and people are excluded based on those interests despite trustful relationships, as we saw in the instance of the choice for either Measuring System A or B. The industry engaging practice showed how building stronger informal and trustful relations was a form of engaging people and get things done from them. The refitting practice showed that when trust is violated, participants engage in networking practices to try solve the consequent issues and in so doing exert power. These instances render trust to be an instrument in politics in networks: underlying trustful relationships, especially in the case of parties coming from different social systems as is the case in university-industry collaboration projects, are always politics and the going after a party's own interests. Apart from this political embeddedness of trust, we also saw how trust enabled the building of relations through the inclusion of trusted prior ties and how researchers made an attempt to rebuild trust in the refitting practice.

Bruneel et al. (2010) stated that to cope with the barriers in university-industry relations, trust needs to be built through face-to-face contacts and repeated interactions. The study in this chapter shows that this social networking does not automatically lead to trustful relations because (structural) power relations play a role that can constrain how network ties are built and used. Even in the presence of trusting informal relationships, constraints exist that can complicate the deployment of those relationships. Networking is not merely an exchange of resources based on trustful interpersonal relations: as the findings show the power dimension of networking is also important for this exchange to be (effectively) done.

Practical implication:
A third space in university-industry collaborations

Inspired by the exploration of the relational conceptualization of power in networking in this chapter, we explore the idea of university-industry collaboration as a 'third space' through which scientists and industrial partners bridge their respective social systems. By bringing companies and scientists together, engaging in 'people management', and facilitating the network, a space can be created between the different parties coming from the different social systems to make the collaboration effective. This is in line with Giddens, who was against the notion of a social system as a 'closed' unit (Whittington, 1992). Social systems and the boundaries of those systems are constructed through practices. The study showed how these boundaries are also transcended through people's networking practices.

The notion of 'third spaces' is not entirely new. Several scholars have used the term, for instance in relation to education (Whitchurch, 2008), political online behaviour (Wright, 2012), public spaces (Oldenburg, 1999), or participatory design (Muller, 2003). In their advisory study on innovation policy for the Netherlands Scientific Council for Government Policy, Kronjee and Nooteboom (2008) suggest to create virtual or actual third spaces (even in the form of an actual institute) to facilitate the effective collaboration between universities and industry. Third spaces can help put science to practical use and provide 'inspiration' from practice for more fundamental research. We would argue on the basis of our study that more benefit can be gained from such a third space than mere 'inspiration', namely actual cross-fertilization through knowledge, material, and product exchange. Kronjee and Nooteboom (2008) state that certain conditions need to be met to create third spaces: careful selection of staff to enable cross-boundary interactions; time to get to know and understand each other and build trust; and a rewarding environment for participation in university-industry collaborations within the organization - participation in university -industry collaboration must be seen as a good career move within the firm, not as a low-priority task. Here we like to extend this notion of university-industry collaborations as a third space based on the findings of this chapter by adding several more conditions to take into account.

As the study showed, the different participants were enabled and constrained by the rules and resources from their respective social systems. The third space in which participants from multiple social systems come together thus involves rules and a resource distribution that are informed by the intellectual, economic, and political systems. The rules of gaining funding and the growing emphasis on economic and social value of science on the scientific and political side, and the rules of market expansion and innovation development on the industrial

side, form the impetus or framework for the third space. In this space, scientists, industrial partners, and funding agency officers have to develop networking practices that strengthen the bridge between the respective social systems in order for university-industry collaborations to be effective, add value for all parties, and bring about innovation.

Power-balanced participation

From the case study we learned that an informal hierarchy emerged despite the assumption of equality between the parties in the collaboration. The organization of the project and the informal relationship building led to asymmetries in the sense of ownership and decision-making regarding the project. Awareness, recognition and building a language to talk about power dynamics within university-industry collaborations may help for the parties to benefit optimally from the collaboration and not let a collaboration be skewed towards one side. Additionally, the initiative and decision making need to be, at least to some degree, participative and involve all parties from the outset of a project. To have a common goal and project partners that commit to it, participation in the establishment and reaching of that goal is necessary. As we noted, the framework provided by the funding agency can have disciplinary power (Giddens, 1984) to facilitate this through its procedures and materials, such as the procedures for project proposals and meeting agendas. The organization of a university-industry collaboration - in which a funding agency plays an important role - could be oriented towards facilitating optimal and favorable conditions for the building of a power-balancing third space: procedures to give room for input from all parties in the set-up of the project, enough room for input from all parties during the course of the project, and room to include additional partners and experts. Requiring meetings and providing materials such as agendas and the continuation decision to steer (power-balanced) networking as the funding agency did, are helpful measures to create a third space. Another requirement, not kept in the case under study, is that the location of the meetings was held alternately at the universities and the industry companies. Indeed, using only one location for a diversity of partners to come together may signal centrality for a certain party (e.g. the academic hospital) and pave the way for skewed power relations. Moreover, who is the leader of the project (in the case of the funding agency under study: a scientist) impacts the relations of autonomy and dependence, as the discussion of the program officer facilitating the network showed.

Time perspective

In the case study we noticed how industry put daily issues over collaboration with scientists, whereas scientists were pushed by the funding agency officer to complete the measuring instrument and start measurements for their research to finish in time (i.e. within the time allocated for the project). However, innovation development cannot be accomplished in one PhD project, and does not stop with the publication of scientific results, but it takes steps afterwards to go into the phase of commercialization, testing, and production. A longer term perspective on collaborations and shared ambitions can help reduce the parties' conflicting short term orientations. The third space thus extends in time: as innovation takes time, the third space needs to be durable, and therefore requires longer term relations between industry representatives and scientists, possibly after the project has ended. A third party such as a funding agency could develop instruments to facilitate this, for instance by finding ways to facilitate the building of stronger relationships during the projects, or find ways to extend relationships after the projects.

Possibilities for networking

The relational conceptualization of power in networking taught us that power and trust co-exist within (university-industry) networking. Despite the presence of trustful relationships, participants still needed to engage in socio-political networking practices to gain access to resources for which they depended on others. Within the third space, building and maintaining (informal) trustful relations and ensuring strong communication are essential resources that enable harmonious and effective collaboration for both sides. Informal relations are valuable resources in that they steer inclusion of some parties and exclusion of others, ease communication and exchange of resources, and enable people to gain resources in case they are dependent on others' agency. To enable the building of durable relations, not only should relations be maintained over a longer period of time, but it seems required that there is enough opportunity for the scientists and industry representatives to keep regular contact and bond socially. In the project under study in this chapter, this was established through regular project meetings required by the funding agency, but also through for instance the networking efforts of the PhD researchers. Indeed, theoretically, in the long term university-industry collaboration networks may even become so strong that they move toward becoming communities in the sense of the communal system (Whittington, 1992).

Extra-routine mindset

The case study showed how both parties found (or did not find) ways to circumvent rules and resources deficiencies through networking practices, such as the deployment of other employees and through people management. From this we derive that the notion of the third space would entail that both scientists and industry representatives have an extra-routine mindset, i.e. that they step outside of their 'standard' or daily work practices to bring together the resources from both fields and create synergy between the two. This does not mean that they can or should let go of the rules of their own social systems, but that they creatively stretch the boundaries of those systems to come to equal and durable relations and thereby to productive collaboration.

All in all, these conditions, adding to Kronjee and Nooteboom (2008)'s suggestions, may inspire and help practitioners and policy makers to re-evaluate their collaboration practices and policies and possibly improve them. Working to create and develop a 'third space' may help university-industry collaborations to run smoother and succeed, as well as other organizational situations in which a diversity of actors comes together to achieve a common goal.

Conclusion

Relatively little attention is given in networking research to power as a relational concept (Swan & Scarbrough, 2005). In this study we have combined the practice approach to networking with a critical diversity perspective to develop a relational conceptualization of power in networking, and applied that to the case study of a university-industry collaboration in the medical sector. In so doing, we opened "a window on interactive innovation processes" (Perkmann & Walsh, 2002: 263) and contribute to the existing knowledge on networking as a practice concept and networking in university-industry collaborations. The study has given us an entrance into the political landscape in which university-industry collaborations are embedded and provided a better understanding of the challenges and opportunities coming about within university-industry collaborations. The study has elaborated the idea of approaching university-industry collaborations as a third space instead of merely different social systems being put together, which may stimulate the development of synergy and eventually foster effective collaboration and innovation development. Future research may develop this notion further, for instance, by extending our understanding of the role of the funding agency in the building of a third space, or of the conditions that enable and hinder the emergence of such a space.

Practicing gender when networking:

the case of university-industry innovation projects*

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Abstract

In this chapter we continue with the development of the notion of networking as a practice through the practice approach and a critical diversity perspective. Specifically, the chapter builds insight in the role of gender in interpersonal networks, which is largely neglected in research on networking. We do so by exploring the concept of "practicing gender" (P.Y. Martin, 2003), the spatial-temporal accomplishment of gender practices, when people build, maintain and exit social networks. The paper is based on a study of men-dominated technological collaboration projects between universities and industry. Our analysis of observations of project meetings and interviews with project participants demonstrates how people in real time and space draw from culturally available gender practices in their networking with each other. This practicing of gender was found to be done largely unreflexively, sometimes through humour, within allegedly trivial activities such as pouring coffee and socializing as well as in critical activities such as composing the network. The exploration of the practicing of gender in relation to culturally available gender practices (P.Y. Martin, 2003, 2006) enabled us to examine how those gender practices are reproduced, stretched or challenged (Lombardo, Meier, & Verloo, 2009) when people network. We show how focussing on the dynamic side of gender allows us to get better insight into how gender inequalities at the macro level (i.e. in networks) are reproduced or countered on the micro-interactional level.

Key words: *practicing gender; gender practices; networking practices; university-industry collaboration; humour*

> *Some are sensitive to that…some are more polite towards a woman [...] the old school. [...]Sometimes you just need to let a door be opened for you and you have to walk through it first [laughs]. And that I always get the first coffee, and then I'm like, well okay.*
>
> [Woman program officer]

> *…because I am a woman, often in men's worlds, you have to prove yourself a little. Just make a couple of good remarks, then you have already conquered your position a little.*
>
> [Woman program officer]

These quotes show how women's experiences of 'being a woman' in the technology field differ. While the first woman diminishes the importance of gender and uses trivial situations to emphasize that gender can only be found in 'old-fashioned' gestures, the second shows how this 'practicing of gender' is something she struggles with. In this chapter we critically explore networking practices in the gendered context of the university-industry collaboration projects and thereby further develop the notion of networking as a practice.

Introduction

Technology is still a men-dominated field of research and of practice. This makes it a suitable context to study diversity on the basis of gender in relation to networking practices. In an organizational context, gender is shown to affect individuals' social networks, usually to the disadvantage of women (Brass, 1985; Ibarra, 1992, 1995, 1997; Loscocco, Monnat, Moore, & Lauber, 2009; McGuire, 2002; McPherson, Smith-Lovin, & Cook, 2001; Vehviläinen, Vuolanto, & Ylijoki, 2010). Networks thus contain inequalities, the "systematic disparities between participants related to power and control over resources and outcomes, opportunities for interesting work and promotion, monetary rewards, respect and status" (Acker, 2006, p. 443). Most of former studies showed gender inequalities within networks by conceptualizing gender as a variable (for instance, Forret & Dougherty, 2004). Despite the useful insights these studies have given us about the existence of gender inequality in networks, little is known about how those differences in networks based on gender are actually (re)produced, i.e. how gender is 'done' (West & Zimmerman, 1987) in networking. It is our aim in this study to contribute to this knowledge by examining the practicing of gender in people's networking practices. To do so, we need a conceptualisation of gender as a routine, ongoing social accomplishment embedded in everyday interaction (West & Zimmerman, 1987). The notion of gender as a social practice helps us

to theorize gender as being constantly redefined and negotiated in everyday organizational practices (Kelan, 2010; Poggio, 2006; Gherardi, 1994), such as networking. We approach networking practices as "structurally embedded, dynamic, socio-political actions of people when they enter, build, maintain, use, and exit their relations at work" (based on Benschop, 2009).

A few studies have already contributed to insights on gender in networking. Benschop (2009) in her study of the networking practices of Dutch account managers, showed how those managers not only reproduce but also counter the gender order through their networking behaviour. Van den Brink and Benschop (2014) showed how gatekeeping practices at Dutch universities have exclusionary effects for women to become full professors. These studies built new and relevant insights regarding the intertwinement of networking and gender practices, using interviews as the main method and studying the ego networks of individuals. However, interviews only access what people can reflect on and make explicit (things of which they are aware) and what they want to say (risking for instance social desirable answers). Interview studies are not able to capture the actual practicing of gender in the 'heat of the moment' (P.Y. Martin, 2003), when people interact with each other without much reflection on their behaviour. Understanding this actual practicing of gender is important, as it is the subtle 'doings' of gender in everyday interactions that contribute to the reproduction (or countering) of dominant gendered cultures in organizations. If we want to know how gender is practiced at the level of a group or network in actual everyday situations, interviews do not suffice.

To further our knowledge on networking and gender and address the shortcoming of interview studies to access gender practices, we explore gender in group-level networking practices through a combination of observations and interviews. Observations enable us to explore how gender is unreflexively practiced in everyday situations and shows gender's subtleties in real-time networking practices. We build on studies that have explored the actual doing of gender in organizational settings, such as ethnographies in the engineering sector (Faulkner, 2009) and sociolinguistic accounts of gendered work interactions (e.g. Holmes 2006a; Holmes & Schnurr, 2005). These studies provide intriguing insights into the swift and unreflexive moments in real-life interactions in which gender is done, and we use those insights to build an understanding of the practicing of gender in the organizational practice of networking.

Our theoretical framework builds on the conceptual framework of P.Y. Martin (2003, 2006), who distinguished between practicing of gender and gender practices. Practicing of gender is the spatial-temporal accomplishment and dynamic side of gender practices, or the practicing of gender 'in the heat

of the moment'. Gender practices are the culturally available repertoires of gender. This framework is useful to conceptually understand the agency-structure dynamic of gender. We build on P.Y. Martin's work to build a better understanding of the practices of gender in interpersonal cross-gender networks. The exploration of the practicing of gender in relation to culturally available gender practices enables us to examine how those gender practices are reproduced, stretched or challenged (Lombardo, Meier, & Verloo, 2009) when people build relationships. Focussing on this dynamic side of gender allows us to get better insight into how gender inequalities at the macro level (e.g. in networks) are reproduced or countered on the micro-interactional level.

The chapter is based on an empirical study of collaboration projects between universities and industrial partners in the technological sector in the Netherlands, facilitated and partially financed by a government-based funding agency. Empirically, these make a good case for studying practicing of gender in networks, as women only form a minority of players (Faulkner, 2001; Fox, 2010) and social networks play an important role in this field (Perkmann & Walsh, 2007). The technological sector provides an interesting theoretical context to explore the practicing of gender in networking. Feminist technology research has shown that gender and technology are co-constructed and co-produced concepts (Kelan, 2007; Faulkner, 2001). Technology is gendered by design and by the enduring symbolic association of masculinity and technology (Faulkner, 2001). Also, men are making the key decisions on technology development (Faulkner, 2001). As technologies are constructed and developed within a social - and therefore gendered - context, "gender relations and divisions are firmly embedded in the creation and development of [...] technologies" (Webster, 1996, p. 35). This renders science and technology to be culturally defined as belonging to the 'masculine realm' (Connell, 2005; Wajcman, 2004), excluding women from entering, driving them to leave the field early, or at the very least making them having to cope with their 'otherness'.

The chapter is structured as follows. First, we explain the theoretical background of the study by elaborating the notions of networking as a practice, 'practicing gender', and its inherent (non-)reflexivity. The next section goes into the research context, method of data collection (i.e. observations and interviews) and analysis of our study. We then demonstrate and analyse in-depth the different forms of practicing gender that men and women of the collaboration projects engaged in when they were developing their social networks. In the final section, we point out the implications of our study, and conclude the chapter.

Theoretical framework

Networking as a practice

In this chapter, we again approach networking as a social practice. Practice research looks at the details of everyday life and at what people actually say and do (Corradi, Gherardi, & Verzelloni, 2010; Nicolini, Gherardi, & Yanow, 2003). Zooming in on actual sayings and doings, one can grasp the unreflective and habitual patterns of activities and underlying norms that constitute social reality (Geiger, 2009). This approach enables studying what is familiar, taken for granted, and tacit. Accordingly, we conceptualize networking practices as sets of intentional/reflexive and unintentional/unreflective activities individuals engage in, that result in the building, maintaining, or dissolving of their interpersonal relationships. We thus not only include the intentional tapping one's shoulder at a reception in the conceptualization of networking, but also activities such as presenting work to others in a meeting, choosing where to sit at a table, chatting during short coffee breaks, or giving a tour of one's company site. All these activities impact the nature of the relationships (or 'ties' in network terms) between individuals. We thus consider networking to not always be intentional, nor reflected upon. This broad conceptualization provides room to explore the "routine and merely unreflective practicing of gender" (Benschop, 2009, p. 222) in networking, as we will explain next.

Exploring the 'ing' of gender

Organizational practices, such as networking, are commonly theorized by organizational scholars as gender neutral entities. In reality, organizations and organizational members practice gender and perpetuate existing gender inequalities when creating policies, arranging meetings, evaluating peers or subordinates, assigning tasks and making plans (P.Y. Martin, 2006). It is within everyday practices that people create alliances and exclusions "that divide and differentiate between women and men, and produce and confirm gender images" (Acker, 1999, p. 184). Gendered practices at work are not necessarily grand gestures or obvious events, but are part of the subtleties of everyday life and must be looked for in everyday interactions (Bruni, Gherardi, & Poggio, 2004).

Approaching gender as a social practice, we position ourselves in a strand of research which emphasizes the performative nature of gender (Mathieu, 2009; Butler, 1990), starting with the development of the notion of 'doing gender' by West and Zimmerman (1987) and culminating in the development of the concept of 'gender practices' (Poggio, 2006). We focus on gender as a situated social practice actualized in the everyday practices through which individuals interact. This focus on the micro-interactional level of gender does not mean

that we do not take into account that micro-interactions mutually reinforce institutional and structural processes (Ridgeway, 2009), and are always related to societal structures, hierarchies, and inequalities (Nentwich & Kelan, 2014).

The concept of gender practices is often used for exploring how gender is enacted in (and outside) organizations. They are the "abstract, general sayings and doings of gender - the repertoire of speech, bodily and interpretive actions" (P.Y. Martin, 2006, p. 257) or, put differently, the culturally, discursively and physically available activities to be practiced in social settings (Poggio, 2006). Together, these gender practices constitute a dynamic and symbolic gender order in which the masculine is hierarchically valued over femininity (Gherardi & Poggio, 2001).

P.Y. Martin's (2001, 2003, 2006) distinction between gender practices and the practic*ing* of gender helps to get a better understanding of the dynamics of gender. The momentary performance of gender practices which she calls the practic*ing* of gender pertains to the "literal saying and doing of gender in real time and space" (P.Y. Martin, 2003, p. 354). In their interactions with others, people draw from the gender practices available to them, which inform their interactional behaviours. By engaging in those behaviours, they then either re-enact and consequently reproduce the gender practice, or stretch and as a result change the gender practice. This implies that it is 'in the heat of the moment' where we can observe the actual accomplishments of gender. It is this practicing that reproduces or changes the gender practices that constitute the gender order in our society and organizations.

This dynamic side of gender has received little attention so far, especially at the level of group interactions (P.Y. Martin, 2006). Reason for this is that it is difficult to capture the practicing of gender at the moment it is done. To capture the actual momentary practicing of gender, for instance during a coffee break when someone makes a sexist joke, one needs to be present at the moment, which requires observational methods. Earlier studies were based on narrative interview accounts and mainly looked at discursive gendering practices (Vehviläinen, et al., 2010; Benschop, 2009; Van den Brink & Benschop, 2014; P.Y. Martin, 2001, 2003, 2006; Holgersson, 2012). These studies provide useful insights regarding gender practices (Poggio, 2006), but do not study the dynamics of gender practices 'in the heat of the moment'. Notable accounts that did study the doings of gender in actual everyday work interactions are ethnographic work by Faulkner (2009) and sociolinguistic work by Holmes (2005, 2006). These studies have helped point to the subtlety, swiftness and often unreflective nature of gender doing in everyday conversations and the effects on the reproduction of a certain organizational culture. This chapter joins these efforts. We do so with the help of P.Y. Martin's framework and focus

specifically on networking practices to understand how the interpersonal building of relationships can also be a gendered activity with consequences for the work relations between men and women.

Through our observational study of interpersonal networking practices, we contribute to the knowledge about gender at the micro-interactional level. We look into this practicing of gender to build a better understanding of how gender practices are reproduced and perhaps changed on the micro-level of interpersonal networking activities. Studying the –ing of gender, we can start to comprehend how gendered networking practices lead to or (re)confirm structural gender inequalities, as gender is (usually) practiced unreflectively and unintentionally.

Reflexivity

The notion of '(non-)reflexivity' is core to the concept of practicing gender. Reflexivity refers to the level of awareness of underlying meanings and norms that are inherent in a practice (Nicolini & Roe, 2013). It holds that individuals do or do not "use their human capacity to step back and think about their situation, considering consciously what regulates their behaviour" (Howard-Grenville, Golden-Biddle, Irwin, & Mao, 2011, p. 525). Attending to (non-)reflexivity in practice research takes issue with utilitarian-rational theories of human agency which do not recognize that much of our conducted is enacted without reflection (Mathieu, 2009). This is especially the case for the performance of gender. The practicing of gender is done in the immediacy of social interactions (P.Y. Martin, 2006), and is therefore mostly done without intent or reflection. People usually do not intend to 'do' gender, yet the unintended outcomes of their practices are gendered (Mathieu, 2009). Because of this non-reflexivity, "well-intentioned, 'good people' practice gender in ways that do harm…sexism and gender bias in their subtle forms, constituted through non-reflexive practising, are rarely recognized or condemned" (P.Y. Martin, 2006, p. 255). That most of the gender practicing happens unreflexively explains why men and women can deny the role of gender, whereas in their behaviour gender indeed plays a non-trivial role (Holgersson, 2012).

Practicing gender thus is usually routine, nearly invisible to practitioners, and difficult to see or name overtly (P.Y. Martin, 2001). The level of reflexivity with which gender is practiced varies for different people (men and women) and is context-dependent. For instance, when women cope with their being a (token) woman in a predominantly masculine environment, we expect them to be at least partly aware of their practicing. Men, on the other hand, as the majority group, are likely to, for the large part, be unreflexive about the role of gender (Acker, 2006; P.Y. Martin, 2003). In our empirical study, we explore how men

and women, the latter being relative 'newcomers' in the male-dominated field of technological innovation, are reflexive regarding their gender practicing.

Overall, we observe that the gender literature looks primarily at culturally available gender practices, whereas the actual accomplishment of gender practices through the *practicing* of gender remains largely unexplored. The theoretical framework of the unreflexive practicing of gender in networking provides us with the conceptual tools to explore how men and women in men-dominated technological innovation projects practice gender when they work on their interpersonal relationships. By conceptualizing and demonstrating gender and networking as intertwining social practices, we contribute to our understanding of (largely unreflexive) gendered networking practices and their consequences. These insights will enable us to understand how people's networking practices either reinforce or counter gender inequality.

In the following section, we explain our research design and methodological considerations.

Research design

Research context and cases

The chapter is based on a multiple-case study of six technological university-industry collaboration projects in the Netherlands. Networking is increasingly important for (technological) innovation (Berkhout, Hartmann, & Trott, 2010; Dhanaraj & Parkhe, 2006; Lam, 2005; Valk & Gijsbers, 2010). Add to that the gender imbalance of the technological innovation field (Vehviläinen, et al., 2010), and this context presents a good opportunity to look into the practicing of gender in formally arranged and informal networking.

The empirical material was collected as part of a research project for a Dutch funding agency, which facilitates technological innovation projects between scientists and industry partners to improve cooperation between universities and industry and to involve potential users in the development of new scientific knowledge or technologies. The organization facilitates around 500 projects in the fields of nanotechnology, ICT, civil and mechanical engineering, and life sciences. Participants in the projects are usually a project leader who is a university scientist, one or more co-project supervisors (senior scientists), PhD students or postdoctoral researchers who conduct the scientific research, four to six industry representatives – research directors or members of R&D departments – called 'users', and a program officer from the funding agency. The projects for the present study were chosen on the basis of the criteria that

they started after 2009 and that they included at least one woman. Table 4.1 shows an overview of the projects and collected empirical material.

The sex composition of the six projects was highly skewed in five out of six projects: the number of women was significantly lower than men, with mostly two or three women in a group of 14 – 23 people. The only exception was the network in the medical field: here, about one third of the participants were women. Furthermore, in none of these networks there were women among the industrial representatives or the university professors; women were either PhD, assistant/associate professor (e.g. some project leader), or a program officer or management assistant from the funding agency. The projects thus seemed to mirror the imbalance of the larger technology field.

Data collection

Making practices visible requires interpretative and qualitative methods which enable the examination of actual 'sayings and doings' of individuals (Nicolini, 2009; Yanow, 2003). The data collection method therefore consisted of observations of network meetings, complemented by interviews. Observations are an (if not, the most) appropriate method to reveal the practicing of gender: "showing the 'how' of negative discrimination requires prolonged direct observation" (Czarniawska, 2006, p. 238). Despite some exceptions, studies of gender practices through real-time observations are much less common than interview studies.

Observational data were used of 17 formally arranged, half-yearly meetings of the six innovation projects (lasting 3 to 5 hours, including lunches and company tours). All projects were observed two or three times over the course of the data collection. Due to the confidential nature of the meetings, it was not possible to record them on camera or tape. A micro-ethnographical approach was taken to enable a detailed recording of what was going within the meetings and informal moments during the meetings such as coffee breaks and lunches, with the use of field notes and maps of table arrangements. The observer arrived early, before the majority of participants arrived, and lingered after the meetings had finished, to be able to record as much as possible of the socializing and informal networking that went on in and around the meetings. The observer included in the field notes the seating arrangements and what the room looked like, with whom men and women participating talked during the meeting and socializing moments, what the input was of men and women during the meeting, who made jokes with whom, who looked at or whispered with whom, who interrupted others and who were silent, etcetera. These details could potentially provide clues as to the exclusion of certain actors (women or

Table 4.1 **Overview cases**

Name project	Field	Participants*	# women **
MechEng1	Mechanical Engineering	Project leader 3 Fellow project applicants 3 Executive researchers 5 Industry representatives Other Program officer Management Assistant	1
MechEng2	Mechanical Engineering	Project leader 3Fellow project applicants 2Executive researchers 9Industry representatives Program officer Management Assistant	1
MechEng3	Mechanical Engineering	Project leader 4Fellow project applicants 2Executive researchers 6 Industry representatives Other Program officer Management Assistant	1
MediPro	Medical technology	Project leader 3 Fellow project applicants 3Executive researchers 6Industry representatives 5Others Program officer Management Assistant	7
CivEng1	Civil Engineering	Project leader 2Fellow project applicants 4Executive researchers 12Industry representatives Other Program officer Management Assistant	2
CivEng2	Civil Engineering	Project leader 2Fellow project applicants 3Executive researchers 15Industry representatives 2Others Program officer Management Assistant	2

* *Based on most updated participant lists used for the survey in January 2014.*

** *Leaving out the management assistants, who were all women.*

men) from the networking and to the overall (possibly gendered) culture of the meetings' hosts. As says Lauche (2011), "[b]y looking at these small signs on the wall we can pick up messages that we would not be able to capture as 'text'". The observer took a spectator or bystander role in the meetings, rather than being a participant (Spradley, 1980). Additionally, she participated in and observed two annual congresses of the funding agency.

Interviews complement the observation material by providing an understanding of the gender awareness of the project participants and their reflections on these issues, which can help to better understand what is seen in the observations, in which the practicing of gender is often done unreflectively. 52 semi-structured interviews were held with project participants, including women and (a majority of) men. The interviews were conducted shortly after the first round of observations, but time constraints prevented a systematic reflection of all interviewees on what was observed in the meetings. Interviews lasted between 45 minutes and two hours. Besides questions about goals, involvement, and project progress, participants were asked to comment on the role of the different network participants, the nature of relations within the project group, and how gender and other identity categories played a role in the course of the project or the interpersonal relationships. Appendix A provides the interview guide. We for the large part used the parts of the interviews that focused on diversity and gender to gain a picture of the perceptions of the (men and women) project participants on the role of gender in the projects and the technological field at large.

Data analysis

The data analysis was an iterative process of going back and forth between data and literature. The observations were analyzed to build an account of the project participants' networking practices and the practices of gender within that networking. The interviews complement these observations. Interviews provide insight in the sayings rather than the doings (P.Y. Martin, 2003), so actual networking practices and practicing of gender cannot be captured by interviews. Yet interviews do give access to gender practices as interviews are a site in which gender is done. People do gender in interviews when they tell stories about and reflect upon their behaviour in interaction (Benschop, 2009). In the analysis we combined and confronted the findings from both observations and interviews to understand the practices of gender in networking.

First, we open coded (Strauss & Corbin, 1990) all moments in the observations and all interview quotes in which the momentary practicing of gender occurred. These open codes included explicit referrals to someone's gender, the domination of men in the field, remarks about sex ratio of the meetings, the atmosphere of the meeting, the social skills of women, irrelevance of gender,

competencies, gendered division of tasks, gendered jokes, gaining visibility.

We then searched for patterns in the practicing instances, which led to five categories. We started with the accounts and reflections about gender in the field of technological projects. The exploration of the interviews led to an account of the perceptions of project participants regarding the issue of women in technology science and industry, which was predominantly marginalizing the role of the gender ratio in the projects and the wider context of technology (first category: *marginalizing the role of gender*). Though interviewees said that professional merits were more important for the projects than gender, in the observations we noticed several instances in which gender was made relevant. We observed how the presence, participation and contribution of women to the technology field was *disregarded* (category 2). In relation to men and women present, people referred to women in terms of their gender, through jokes or ascribing 'feminine' tasks or characteristics to them (category 3: *referring to women's gender*). In line with the fact that gender does not merely revolve around women and the projects were highly men-dominated, we found instances in which men did gender while building relations with other men, which we labelled *men connecting with men* (category 4). Finally, in these men-dominated projects women have to cope with the specific gender order of technology. We labelled this fifth category '*manoeuvring within the gender order'*, as that captures how women not only responded to but also initiated practicing of gender.

After identifying these patterns, we continued with an in-depth analysis of each instance of practicing gender on the basis of P.Y. Martin's (2006) distinction between practicing and practices. The questions we asked our data were, what do we see happening here that is gendering? From what gender practice do the people in this specific instance draw? And what consequences does this practicing of gender have for the woman/women involved, for the network relationships she is/they are involved in, and for the reproduction (or countering) of the larger gender order? Conducting this in-depth analysis and rereading gender practice literature, our attention was drawn to how the participants practiced gender without much or any reflection (P.Y. Martin, 2003). We also found that participants sometimes used humour in their practicing of gender, so we turned to literature on gender and humour to gain a better understanding of the functions of humour in those instances. We found that humour is a way through which identities are constructed (Crawford, 2003) and work relations are built (Holmes, 2006b), so we take humorous interactions to be more than mere 'amusement'; they indicate how individuals define their relationships.

We present a selection of instances of practicing in the findings section. As practices are situated and dependent on the relationship between actors, the instances of practicing were chosen "not on the basis of their statistical

representativeness [...but] in light of their evocative content, their ability to highlight the complexity and richness of experience" (Poggio, 2006, p. 230).

Reflection

As qualitative researcher, I am aware that the presence of me, the first author/observer and a woman, may have influenced both the interactional behaviours of the people and her perception of those behaviours. For instance, in the interviews several instances came up in which gender was practiced, when interviewees explicitly referred to my gender to make a point, or when gender stereotypes were brought in to explain the lack of women in the field. This illustrates that an interview can be seen as a (gendered) social practice by itself. Furthermore, acknowledging that knowledge (production) is always situated (Haraway, 1988), my interpretations of the empirical material may be influenced by my positions as a feminist organization scholar, oriented towards balancing gender inequalities in science and society. The interpretations of the empirical material came to be through extensive discussions among me and my supervisors, as well as the gaining of feedback from journal reviewers, conference discussants, and the funding agency involved in the overall research project. This helped us nuance certain attributions and interpretations and made us extra careful not to ascribe intentions to behaviours observed where we could not verify those ascriptions. We furthermore remained open to perceptions and behaviours that were the opposite of gender inequality reproducing, which enriched the study as it was able to show multiple instances of practicing gender that went against gender inequalities, as we will show.

Findings

In this section we analyse the different ways in which gender was practiced by the participants of the technological collaboration projects.

Marginalizing the role of gender

According to interviewees, the technical world is a *"men's society", a "men's community", a "male bastion"*. Interviewees acknowledged that the technical world is male-dominated. They practiced gender when asked about their perceptions of the men/women ratio in the projects and what relevance this may or may not have. Prompted by this question, participants talked about the low number of women in the projects and their wider technological environments, and made the role of gender seem marginally relevant for the functioning of the committees. People were used to having few women around and often saw this as a natural status quo, thereby implicitly or explicitly legitimizing that there

are far less women than men in the projects. This relative invisibility of gender in technology is taken for granted in the everyday interactions in this field (Johnston, 2009). Many interviewees did not reflect on how this lack of women in the networks came about, which is in line with Kelan (2007)'s finding of people in ICT claiming not to know why a scarcity of women still exists in that field.

"It doesn't matter [to me]" was a common answer to the question whether the low number of women played any role in the functioning of the committees. According to the interviewees, the men/women ratio was irrelevant for the functioning of the networks. Most women indicated that they were not 'bothered' by their womanhood, in the form of discrimination or otherwise. When asked in the interviews, most women, like men, negated the relevance of gender and denied its importance for the projects. This points to a disembodied view of themselves as knowledge producers, a gendering practice that ignores who is producing the knowledge and renders the gender inequality of the field irrelevant (Gherardi, 2011). This is also in line with Rhoton (2011)'s finding that women denied gender inequalities, to "situate themselves as professionals in ways that are consistent with the cultural norms and expectations of their occupation" (p. 698). What mattered in the interviewees' perceptions were personality, experience and competences. A woman program officer said for instance:

> *I'm not engaged on that [topic] at áll. To me [...] diversity [...] is just the right people. That you notice that there is momentum, that there is a click. That there are contributions and input. That energy is put in, and that can be done by any person. It's just about that they are all involved on the same level in a project and that they know what they are working on and what they have to offer, so to say. And that can be simply listening, so you're not that involved […] and the ability to indicate if [the project] goes into a direction that is realistic. And as such, you need something from every discipline. And also a personality that says, I'm up for it. It just needs to be right content-wise, so to say.*
>
> [Woman program officer]

This program officer dismissed the importance of gender by emphasizing how the gender issue is not her priority "at áll", and that diversity is related to complementarity of knowledge, personality, and input that creates synergy. Interestingly, despite their little experience with women project leaders, two of the interviewed program officers (white, middle-aged, heterosexual man and woman) dismissed the role of gender for the functioning of a project leader and brought in the argument of personality as a more salient factor. With this personality argument, diversity became unlinked to gender and thereby covered up the subtle workings of gender that contribute to gender inequalities.

This indicates that participants' perceptions were informed by the gender practice of emphasizing and believing that one's 'objective merits' are decisive for participation, not one's gender. Interviewees did not believe gender made a difference for the projects because of this merit argument, or because

> *Everyone who participates in the project is a human being in the first place, and man or woman in the second…There are always differences between people, one man is also different from another man, and one woman is different from another woman, so I don't feel like, hey, this or that is a specific female phenomenon in the project or something.*
>
> [Man industrial representative]

As illustrated by this quote, many interviewees did not believe men and women essentially differed in their behaviours (e.g. "masculine or feminine approach") and gender therefore did not matter. Contrary to this, it was often argued that the atmosphere of meetings (positively) changed when women were present – which is informed by the gender practice of ascribing women a social and relational (instead of a task or instrumental) orientation - but that was not seen as essential for the functioning of the projects. An argument often made was that more women are "*welcome*", "*favourable*", yet "*not a must*", "*no necessity*" and "*not critical for a project*". Despite their beliefs that women bring different social interactions to a group, interviewees did not argue the presence of women mattered content-wise. Separating the social from the content, they decoupled the social processes from the outcomes of the projects without much reflection, which contributed to their passive attitude toward gaining more women. As interviewees negated gender and emphasized professionalism, this dismisses them from actively engaging in increasing the number of women and justifies a passive attitude:

> *It is hard enough to find candidates, but well, I will not reject a good male candidate to go and wait for a potential woman that may never come. That's not possible.*
>
> [Man project leader]

This quote illustrates the passive attitude of this project leader to enhance the gender ratio in the projects. Since project leaders are the central persons in composing the networks, their attitude is crucial for possible change in this respect. His implicit message is that women are simply not there. It is women's individual responsibility to enter the project networks and be more engaged in the field: they will have to come to him if they are to be included in research

projects.

Though the marginalizing of gender was the prevailing perception, some people were explicitly supportive of women in their fields and networks. The ones who seemed more aware of the underlying reasons for the gender issue acknowledged the role of socialization of boys and girls ("*you [referring to the woman interviewer] had to play with dolls*"), Dutch culture, and the unconscious stereotypes of gender, which is similar to explanations given in Kelan (2007) 's study of ICT workers. One (man) industry representative showed a high level of awareness when stating that more women and their "*content-wise presence*" would be desirable for 'loosening up' the current conservative attitude within his sector. A professor showed his commitment to supporting a woman scientist in his group in developing her academic career. A man program officer mentioned how, as women are so scarce in his projects, women project leaders in his eyes deserved a different ("*extra careful*") treatment, with the purpose not to lose them. Remarking that this issue is a "*small detail*", this officer assigned little importance to the issue. During the interview he did show a slight proactive attitude towards stimulating women to become project leaders, and said to be more inclined to attend PhD ceremonies for women than for men in this projects.

Interviewees were thus partly aware of how gender mattered in the projects: when asked, they acknowledged the lack of women, and would welcome more women. Yet, the majority considered gender as only a marginally relevant issue which does not matter for the functioning of the projects. Consequently, few interviewees actively engaged in attracting and finding more women. Responsibility for entering the projects and the broader networks was thereby put on women themselves, though once women were present, some men did seem keen to keep them in. This predominantly passive and unreflective attitude helps to keep in place the current gender order of the projects and the larger technology fields, though some examples of participants do indicate a certain awareness of the relevance of gender.

We contend that the fact that the fields and particular projects under study were "man's worlds" - as acknowledged by the interviewees - informed the practicing of gender by project participants in their networking during the project meetings. In the following four sections, the observational excerpts provide insight into the networking practices of men and women, giving us the tools to explore and analyze their practicing of gender. We will show how practicing gender is often done unintentionally and unreflectively, within alleged trivialities and mundane events, sometimes through humour, and we will explain which consequences this may have.

Disregarding women

The practice of disregarding women pertains to the (un)intentional making invisible of the presence, participation, and contribution of women in a particular field, in this case in the Dutch technology sector. Following, we illustrate this practice with an observation from one of the annual congresses of the funding agency.

As also discussed in the previous chapter, an important networking practice of the funding agency aimed at stimulating university-industry networks is the agency's annual congress. In 2011, the congress consisted of a one-day plenary conference with a series of speeches on one central stage. All speakers were men. In the morning, three influential figures gave speeches: the director of the funding agency, the chair of the Social-Economic Council, and a Board member of the Federation of Technological Universities (the Netherlands). All three men discussed the Dutch national ambitions, becoming a knowledge economy, and the importance of innovation and collaboration between universities and industry for those ambitions. 'Sustainability' was an important item. The latter speaker stated that for the Netherlands to become an innovative country of relevance, the "Human capital agenda" should be taken into account, as in the country there is a " lack of people on all levels". In the afternoon, clips of spin-offs and start-up companies were shown, after which representatives of those companies were interviewed on stage. The conservative attitude of customers was said to make it "*difficult to find customers*". Moreover, one representative mentioned how innovation "*is all about people, not just money. Implementing innovation is not easy.*" None of these speakers mentioned the issue of gender and women in the technological sectors, or discussed how raising the number of women could be part of the solution to their issues. Apparently, the women issue was not visible or regarded as salient, nor seen as related to reaching the objectives of finding 'human capital' or becoming a 'knowledge economy'.

Reflexivity on the men-women ratio in the field was not entirely absent during the conference, however:

> *During the plenary morning session, awards are handed over to two male senior professors who have done outstanding work in their respective research fields. The host of the day, a Dutch television presenter, asks the winners to come onto the stage to collect their prizes and take a picture. After the two men shake hands with the funding agency's director, they pose for the photographer. As their picture is being taken, the presenter comments in a joking manner, "there is no lady in the picture!" and continues to say (twice), "Well, it's a man's world."*
>
> [Annual congress 2011]

When a person – a celebrity presenter – in a plenary session calls out that the technology field is a "man's world", the stereotypes and image of technology as a masculine affair are reinforced. The taken-for-granted attitude the man displayed, suggests that he did not question this state of affairs, and so did the non-response from either the agency's director, the two award winners, or the 400-headed audience. Considering that a quarter of the audience consisted of women (calculated on the basis of the guest list), these remarks marginalize and make invisible the (growing) role of women in the field.

Additionally, each year at the congress several prizes are awarded to scientists related to the funding agency. The 'highest' annual award - the "Dutch Nobel prize" as remarked by the agency's director during one of these ceremonies - goes to a professor who has excelled in gaining funding from the funding agency, in conducting research and in helping to shape the research field. Since 1998, this prize has been awarded to twenty professors, of whom one was a woman. This affects the visibility of women in the technological sciences, and withholds the showing of role models, reinforcing the 'fraternity' of the field (Faulkner, 2001, 2009).

This category of practicing of gender was not related to project meetings, but was focused on one networking practice of the funding agency as a whole. Frame 4.1 summarizes some more issues concerning the funding agency and the sex balance issue. We now turn to the specific projects under study and the respective project meetings.

Referring to women's gender

> *While pouring in tea and coffee, the host (an industrial representative) tells a male colleague and me - the female observing researcher and only woman present in the room at the moment - about a joke he sometimes makes to his wife. The joke involves a tea-cozy ("theemuts"), which in Dutch is an offensive name for a woman. He says his wife is okay with that. A few minutes later, when asking me what I would like to drink, he repeats the joke, directed at me: "Do you want tea, cozy?" I politely laugh a bit, but do not (know how to) respond.*
>
> [Observation project MechEng2]

In this instance, socializing during coffee and tea became a platform for explicitly referring to women's gender. This category of momentary practicing of gender holds that people in their interactions explicitly or implicitly refer to women participants' gender through small remarks, jokes, and questions. The instance shows a man practicing gender through humour. We witness a man

Frame 4.1 The funding agency and gender

Within the procedures and rules of the funding agency, no measures are established regarding the skewed men-women ratio. For example, there are no requirements of minimum numbers or percentages of women (project leaders, researchers, or industry representatives) in the project committees, nor is it mandatory to include a 'gender aspect' in the project proposals as it is in, for instance, the Horizon 2020 proposals. In the annual reports 2002-2004 attention is given to the number of women in the project networks within the framework of a special stimulation program, but after its merging into a broader program, the annual reports stay silent on this matter. The utilization reports of the funding agency (annual reports on the outcomes of finished projects) do not include this issue, apart from one chart of men and women PhD candidates involved in the projects in 2007.

Besides the core activities of granting money and facilitating projects, the funding agency works on its relations with stakeholders by using several channels to communicate about projects and the agency's performance. Part of the external communications through which the agency informs about new projects, project programs and related news, is the monthly newsletter the agency sends out to stakeholders who have subscribed to it. The organization referred to the women issue in a few editions in 2011-2012. At the bottom of the newsletter, the organization asked for women to become committee members, mentioning the struggle to find enough women and the advantages committee or board membership can provide people:

> *growth of the network, look behind the [funding agency] scenes (insight in assessment procedures), enhancement of the managerial track record.*
>
> [Newsletter funding agency, April 2012]

Also, the agency published an invitation for a women scientist talent day, organized by its overarching organization (again at the bottom of the letter). The invitation pointed to the importance of diversity for science, and how the talent day was aimed to help the advancement of women in their academic careers. The fact that this was published in the newsletter signals that the funding agency is aware of the issue, yet publishing the text on the bottom of the newsletter also indicates that it does not have priority or significant news value. We conclude that the gender issue does not seem to be high on the agenda of the funding agency.

drawing from the gender practice of men interacting with others (usually men) through humour – which the observing researcher experienced as a jocular insult (Kotthoff, 2006). As a result he emphasized the hierarchical relations between men and women. First, the man told an anecdote and joke, then turned this into conversational humour (D. M. Martin, 2004), by directing the joke at the only woman present at that moment. The man thereby made an explicit contribution to gender construction through humour (Holmes, 2011). Making the same joke to the observer as he did to his own wife, the man equated both based on their gender, and expected the observer to react in the same way as his wife, that is, accepting ("*okay with that*"). The joke was overtly directed at the gender of the observing researcher, and with that, gender was partially reflected upon.

Emphasizing the observer's gender through a joke set her apart from the men present and through its content could be harmful to her professional identity. The use of humour can be harmful, because "characteristics are being focused on which lie outside the professional world and detract from the image of professional competence (for women). Jocular remarks at the expense of women are thus subtle means of excluding them from what was formerly an all-male world" (Kotthoff, 2006, p. 12). The woman's repertoire to react to this practicing of gender was limited: first, the practicing was done in the form of a 'harmless' joke; second, the norm for responding was set by the man's story of his wife's response (again, being "*okay*" with the joke); and third, because another man was involved in this conversation, rendering the woman the minority in the event. As a result, her repertoire of allowed reactions was restricted and made her draw from the gender practice that women receive humour passively and laugh about men's jokes (without resisting the insult, which might make her a 'nag') (Kotthoff, 2006).

Besides such explicit references to women's gender, project participants also implicitly referred to women's gender by drawing from the gender practice of ascribing lower status to women:

> *The professor asks in the beginning of the meeting: "Who will take minutes? [Name woman assistant professor]?". The assistant professor looks surprised by the question and says reluctantly "I have no time [for that]". The professor then turns to one of the men PhDs, who are usually the ones taking minutes.*
>
> [Observation project MechEng3]

> *During lunch, a Chinese PhD student who was not yet aware of my role [observant] in the project, asks me whether I am the secretary of the project. When I tell him that I am doing a PhD project, he seems slightly embarrassed by his question.*
>
> [Observation project MechEng2]

> *I [observant] am seated behind the group, next to the coffee table in the back of the room, where I can sit quietly and observe. One of the attendees walks over to the coffee table to get a cup, looks at me and asks whether he can get another cup of coffee. I smile, shrug my shoulders and say "of course".*
>
> [Observation project CivEng2]

These instances relate to the roles women are sometimes ascribed in the networks, and tasks allocated to them, that are usually part of a lower-status position (secretary), such as taking care of the minutes and the coffee table.

This practicing happens unreflectively: because the men in the projects have few examples of high(er) status women in their environment, they routinely allocate these tasks to belong to a woman's repertoire of behaviours. The target people appeared to be more aware of the gender that was practiced in these instances: the reaction of the first woman was surprise and resistance, though she defied the practicing of gender by refusing to take up the task. When confronted with his wrong conception of the observing researcher, the man in the second instance became aware of his mistake after being confronted with the observer's real role in the project and was embarrassed. In the third instance, the researcher felt slightly insulted by the man's remark, yet kept the gender order intact by smiling and not going against his remark, through, for instance, explaining her role in the project. The reactions given by the several people involved in these instances are negative, implying that invoking these stereotypes was harmful, reducing the women's input and status (and self-confidence) (Tsouroufli, 2012).

Men's gender was also referred to by participants, in the sense that they were often seen as default project participants (the result of the prevailingly men-domination in the projects). For instance, one of the woman program officers did so during an interview, when talking with a low tone of voice, as if she were a man, about scientists and industry representatives networking in the projects. Doing so, she practiced gender by displaying the physical difference between men and women, through a different depth of voice and thereby showed how her default image of an industry representative was a man, not a woman. She did so as well in the next excerpt, referring to the different backgrounds (*macro* - constructions versus *micro* - chemistry) of the industrial participants:

> *Well it is not [..] an old boys' network, right, there is not a lot of laughing…they all respect each other, but they are still so remote from each other. Because that [diversity] is reasonably large in this project…so you see that the 'macro' men are less part of the 'micro' men and vice versa.*
>
> [Woman program officer]

In this quote, the woman program officer uses the term 'old boys' network' not to indicate the men-dominated character of the projects, but the fact that is not a solid and established network. She thereby took for granted that the networks consisted for the large part of men, which is reinforced by her talking about the participants as the '*men*'.

Practicing gender by explicitly referring to one's womanhood, making gendered jokes, and implicitly ascribing women a lower status (and related tasks), results in women and men being separated, with possible negative

consequences for their professional identities. A further consequence is inequality in and potential deterioration of the interpersonal relationships. The overall result of this practicing is reproduction of the gender order, though some reactions, as shown by the woman refusing to take up a minute-writing task, can also work to challenge it.

Men connecting with men

Whereas the former category of practicing of gender was mostly directed at women, men connecting with men was predominantly done by and towards men. We found that this practicing was done in two ways: first, men sought out relationships in the project networks primarily with other men, and second, they were sometimes found to 'behave like men' during the meetings. Some women, when discussing their status as a token in their environment, said to experience this latter kind of masculine display as harmful, or at least, confusing. The result of this practicing is that women were negatively affected and (unintentionally) excluded from the relationship building and strengthening.

First, men connected predominantly with other men in the composing of the projects, which can be typified as affilitating masculinities (P.Y. Martin, 2001). The relationships between the scientists and industry representatives were for the large part (long) existing. These networks consisted almost entirely of men. In the case new people were included in the networks, this was usually a replacement of old ties (within the same industrial companies). This using and reinforcing of old ties does not give room for new ties, e.g. with women, to be established, and reproduces the dominance of men in the projects (Van den Brink & Benschop, 2014).

The practice of men connecting with men was also present in the search for PhD candidates. An external report of the funding agency* showed that a minority of the PhD students involved in the funding agency's projects were women: 23% women versus 77% men. The inflow of women PhD students from outside the Netherlands was almost twice as large as the women PhDs coming from within the country. The organization concluded from these numbers that relatively few women in the technical sciences in the Netherlands flow through to PhD positions. Despite this awareness, no policy was mentioned within the agency to grow awareness of the gender issue regarding (Dutch) women PhD candidates, nor to increase their numbers. Additionally, the program officers of the funding agency in the projects I followed did not mingle with the application processes of PhDs and postdoctoral researchers to increase that number. Hiring

* *"Utilisation report 2007"*

PhD candidates or postdoctoral researchers was the responsibility of the project leaders and senior researchers related to the projects. Although some procedures for the PhD positions had been open, the PhDs eventually selected were always already in one way or the other present in the networks of the project leaders or fellow project leaders who had to choose people for those positions. Strikingly, all men PhD and postdoctoral researchers had come into the projects through men supervisors/professors. This is in line with Sheltzer and Smith (2014) who found that male elite faculty in biology-related fields tended to employ significantly fewer women than men postdocs. All women PhDs had become involved through either their women supervisors or the woman project leader. This seems to be informed by the gender practice that people prefer seeking out relations with others from their own gender (Van den Brink & Benschop, 2014; McPherson et al., 2001). Though the number of women in the projects (three out of fifteen PhD candidates and postdoctoral researchers) was too low to generalize these findings beyond these projects, if this is an indication of a larger trend it would imply that women have smaller chances to enter the projects due to the already much lower number of women on high positions in the technology field.

The second way in which men connected with men, observed during meetings and mentioned by interviewees, is that in men-dominated meetings men display different interactional behaviour, e.g. they are said to behave more like "*machos*" or "*roosters*" (which much like the 'social orientation' for women, is stereotyping men). This can be typified as a form of 'mobilizing masculinities' (P.Y. Martin, 2001), "wherein two or more men concertedly bring to bear, or bring into play, masculinity/ies", or 'men behaving as men' (p. 588). More specifically, some of this mobilizing observed could be typified as 'contesting masculinities', a practice through which men separate themselves from other men through banter or self-promotion (P.Y. Martin, 2001). This practice is done unreflectively, is not directed at women per se but can be enacted in the presence of women, and it is often harmful and exclusionary towards women experiencing this practice. Several instances during the meetings were experienced by the observant as 'typical' masculine behaviour – mockery, wisecracking, banter, teasing, sarcasm. For instance:

> *The man PhD candidate gives arguments for a type of material he selected. "Do you get me?", he asks rather haughtily. The reaction from his all-male audience is laughter. He sometimes makes this kind of assertive remarks, interrupts people in a somewhat clumsy and rude way and is quickly on the defensive. When two industry representatives are discussing a certain element of the research, the PhD interrupts and says he wants to continue with his explanation. People again laugh. Later, as an answer to some questions, he states quite assertively that a woman has given him the advice to proceed in the way he has chosen, so "that is how I will do it". One of the industry representatives says, mockingly, "Well, then I won't say a thing". Again, the men laugh sneeringly.*
>
> [Observation CivEng2]

This instance shows how different men tried to distance themselves from the PhD candidate to their own advantage or the candidate's disadvantage. The reactions of other men to the PhD student's somewhat overconfident behaviour were laughter, challenging, mockery, and attacking. What was witnessed here and in other meetings can be classified as "verbal duelling" and "humorous aggression" (Kotthoff, 2006). Humour is a way for masculinist norms to be manifested through contestive, challenging, and even abusive styles of interaction (Holmes, 2006). Humour is used here to 'punish' the overly masculine behaviour of the (lower-status) PhD student by public humiliation, a traditional performance of masculinity. Sarcasm, which was frequently used by one particular sceptic industry representative, is an aggressive form of irony and indicative of unequal power (Kotthoff, 2006). Humour and non-reflexivity go hand in hand in this instance: through their aggressive humour the men mobilized masculinities, and excluded the only woman present, who remained silent (even though she was the supervisor of the PhD student).

In another instance of mobilizing masculinities, another PhD candidate engaged in this gender practice using his body:

> *The PhD is presenting, standing beside the PowerPoint screen in front of the group. One of the industrial representatives suggests to do a different way of measurements for the PhD's research. The PhD responds that would complicate things. The project leader and PhD's supervisor – the only woman in the project - explains why that would be a problem, as the PhD would have to work with heavy materials. The PhD responds by showing his arm muscles, while saying, jokingly, "Well, I am strong!". The other men start laughing, the woman does not respond and starts browsing in papers that lie in front of her on the table.*
>
> [Observation project MechEng2]

Making this joke by showing particular features of his masculine body, his arm muscles, and mentioning his strength, the student related to the gendered stereotype of men being physically strong, directing his joke at the other men present while also having a woman as his audience. In so doing, he reflected upon, distanced himself from, countered and ridiculed the worry of the woman. As a consequence, though likely not intended as a harmful joke, this use of humour put her in the position of (overly) concerned, worried and caring

woman, whereas he positioned himself as 'one of the guys'. The woman did not respond and so withdrew herself from this masculine display and the following laughter of the other men present. This event set her apart from the others in the project, and excluded her for the moment from the bonding in the group.

In the interviews, several women participants explicitly or implicitly pointed to their negative experience with this gender practice of mobilizing masculinities. An example is one woman assistant professor who once noticed a change of atmosphere in a meeting when all other women had left and she was left with only men. The men all of a sudden changed to different topics than when the other women had been present:

> *It has happened to me that I was left as the only woman in the room and it completely went into a men's realm and they really started talking about other things than they normally do when the women are still in the room. That really surprised me. I thought, oh so now I'm one of the guys? Or well, I don't know exactly, what to think of this? [I: Did they involve you?] Um, a few men yes, and some others that then [sighs and thinks] maybe ignored [me] more, or something, yeah I don't know. I don't dare to say, how or what. But you did notice that the atmosphere had changed, when as more women left, the atmosphere changed.*
>
> [Woman assistant professor]

This woman was clearly reflective of change happening around her, even relating it to her gender ("*So now I'm one of the guys?"*). Her reactions to these men concertedly mobilizing masculinities were surprise and wonder about the change of atmosphere. She was confused as her reflexivity showed limits in that she could not form a coherent explanation of what was happening around her at that moment ("*What to think of this?"*).

In brief, drawing from the gender practices of preference for network relations of their own gender and mobilizing masculinities, both the way in which men were included in the projects through networking and the way men behaved towards other men (and women) in the meetings, resulted in women being or feeling excluded from relationship building, or encountering moments of exclusion. The result is the reproduction of the existing skewed gender situation.

Manoeuvring within the gender order

The last category of practicing gender we explore, shows women's agency in response to being part of a male-dominated environment and encountering gender practicing.

Although the majority of women participants denied the importance of

gender for their working lives and the projects - as discussed in the section '*marginalizing the role of gender'* - their mentioning of instances of subtle discrimination or gender issues in their direct work environment showed that they were in fact aware of their gender and possible (negative) consequences of them being a woman. In line with earlier research (e.g. Rhoton, 2011; Van den Brink & Stobbe, 2009) and the gender practice of 'marginalizing the role of gender by emphasizing professionalism', women distanced themselves from their womanhood ("*I have always been one of the boys")*, said to avoid "*exceptionally feminine"* characteristics or activities (e.g. pouring coffee), to adopt masculine activities (*"take up more space in conversations"*) or to feel uncomfortable when being treated as a woman (which an interviewee considered to be "*out-dated"*)

> *Concerning myself…[silence, thinks].Well [..] I think that sometimes, yeah they do always think it's interesting when I'm there [chuckles]. You just notice that. You get, because I was thinking I should actually take a position at the table that isn't so prominent, you know, always in the middle, always close to the project leader. And I also always get a very prominent role [assigned] in such meetings whereas I'm like, this meeting goes so well, you should be able to take some distance from it. But I can't even take up that role, because as you are a woman, they invite you, yeah they still portray quite the gentleman's behaviour there, old-fashioned gentleman's behaviour, like 'women first' and such. So you almost cannot escape it...I notice that. So I think when a male program officer comes into the project, that ... he can sit on the other side of the table where he is almost not seen.*
>
> [Woman program officer]

This program officers reflects on being visible because she is one of the few, if not the only, woman in the projects she facilitates. She sees herself as put into a certain ("*prominent"*) position because she is a woman, which she finds undesirable yet sees as inevitable: *"so you almost cannot escape it"*. Her gender keeps her in that sense from her preferred way of acting in the project meetings. In this excerpt the officer takes the issue quite lightly, proven by the chuckling. This example illustrates women's narrations that show that they experienced and reflected on a conflict between gender identity and professional identity, sometimes forced to do so by a particular situation, and often coped with that conflict by adjusting their own attitude or behaviour. They might do so in order to fit in the masculine realm (Connell, 2005) and the 'fraternity' of the technological field (Faulkner, 2001).

Whereas the former is what women *said* they did, the observational excerpts enable an insight into the momentary *practicing* of these women coping with their womanhood and professional identity in real-time. In the previous chapter

on power we discussed a situation in which the woman program officer was overruled by two men senior researchers when trying to steer the meeting (p. 95). There, we witnessed a power play that took place at an intersection of identities. During the interview this program officer of the subsidizing organization had expressed doubt about her role and influence in the projects and talked about that, as a woman, she had to put in even more energy to be taken seriously. This implies that her lower-status 'womanhood' amplified the already less powerful status of her being the subsidy organization's program officer. Her gender identity thus further depreciated her professional identity. This resulted in her fear to be regarded as the *"secretary from the subsidizing organization"*. To gain legitimacy in the group, she purposefully avoided to engage in 'feminine activities' and had to make an extra effort by demonstrating her expertise:

> *And if you feel that that's the case [that men don't take you seriously], do not pour coffee. If you do, men easily take this up as if you are only there for pouring coffee and writing the minutes.*
>
> [Woman program officer]

This shows how this program officer was highly aware and reflexive of the role of her gender in her function as program officer. The intersectionality of her being a (younger) woman and having a function in the 'margins' of the networks made her having to *"conquer"* her position in the group. She refused to follow the culturally available gender practice of women serving men (coffee and tea) and fought for her position, which implied she had to work to 'overcome' her womanhood and gain access in the male bastions of the projects she facilitated. We see how she takes issue with gender-technology constructions that "offer women only marginal or 'outsider' status within technological cultures" (Henwood, Plumeridge, & Stepulevage, 2000, p. 112). In the observation, the intersection of being both an outsider as program officer and a woman comes to the fore as she is opposed by two higher-status men. The gender implication of their downplaying of her idea was not reflected upon. Her reaction to the power play in the observation was embarrassment, expressed by her blushing, and retreat, as she silently consented with the proposition of the professors. This gives clues as to her being at least somewhat aware of the practicing of gender of that moment.

Another way women manoeuvred with the practicing of gender of men was by feeling resistance against that practicing of gender, yet suppressing those feelings and refraining from responding. Following is a situation in which a man professor practiced gender by addressing a woman project leader's gender directly, to which the woman reacted by suppressing resistance:

> *After the meeting and lunch, the group of scientists and industrial representatives are taken to a visitor centre by the host of the day (an industrial representative). The first product on display is a women's chest X-ray machine. Above the machine, a big sign says "women's health care". The group, consisting of eight men and two women (the project leader and the observing researcher), gathers around the machine. One of the (men) professors turns around to the women, who are standing next to each other, and says "well, ladies" – his intonation suggesting that this is particularly interesting for them. The project leader whispers to the observing researcher, "I really do not want to see this". Nevertheless, she steps forward and takes a central position in the group to listen to the explanation of the guide about the machine.* [Observation project MechEng2]

The excerpt shows how gender is a basic category for distinguishing others, and how this can negatively affect women. The chest X-ray machine is a sensitive issue for women as it relates to women's diseases such as breast cancer. The project leader did not intend to pay close attention to the machine, until she was identified in public as a woman by one of the professors and (therefore) a target for the guide's talk about this specific machine. The emphasis on her womanhood puts her gender above her professional identity, and is not countered by the 'target' woman. Yet, the sentence she whispered to the observer indicated she was reflexive about the gender implication of the remark, and that she felt uncomfortable around the machine. She however did not show this resistance in public. She thus coped with the practicing of gender by confiding in another woman in a context which was mostly masculine.

Another example of suppressing resistance by women was taken from an interview with a woman assistant professor who indicated she was bothered by 'man-talk' during socializing moments, yet did not do anything about it:

> *Yes, maybe I have, yeah funny, I don't know actually, maybe unconsciously I… well I have always been somewhat more of a, how do you call it, a man-woman or, yeah there are women who are really feminine and there are women who, like, um, I used to always play with the boys, and with cars and such, so always had more interest in technique and those things, so that's why I liked it less to play with dolls. So I often don't really notice it, and I notice here in the group that the guys don't see me that much as a woman, like they do with other women that sometimes join the group. Because sometimes it happens that we [...] are at the coffee table and the boys, they sometimes, well you probably know it yourself, talk scurrilously about women, and oh well, that sometimes also happens when I'm standing there with them. I kind of, well it's about women have done this or that, and I just let that pass. And then sometimes the girlfriend of one the guys is there*

as well or some other lady, and then someone is again talking like that and then another says suddenly, watch it, there are ladies here. Then it does happen. So yeah. Maybe because I'm not really bothered by it, I know this is what those guys do. Well, it doesn't bother me that much, but okay, I'm used to it […]. So yeah, I have to say it doesn't bother me much. But maybe I've just adapted.

[Woman assistant professor]

Expressions like "*talk scurrilously*" and "*it doesn't bother me that much*" (expressed several times) give away an implicitly negative judgment of this display of mobilizing masculinities. She did not agree with it, yet she did not go against it and remained silent ("*I just let that pass*"). Saying *"well you probably know it yourself",* she tried to build common understanding with the (woman) researcher to make her point. In the interview she condoned the men's scurrilous talk in her presence through different arguments: men did not see her as a woman, men knew her personally, she was not bothered by it, she was used to it, had adjusted to it, had always been "one of the boys" and had gotten used to being one of the few women in her environment. The quote points to the non-reflexivity of the men, as she argued that "*the guys don't see me that much as a woman*" and continued the talk despite her presence. She saw herself as being somewhere in between men and women who are very feminine, where part had always been her nature (since her youth) and part was a result of years of accommodating to a "man's world". She implied that if she would have behaved *"really feminine"*, she believed she would have been undergoing many more hindrances. These arguments reveal her complex identity struggles and discomfort with these men practicing gender. It shows how she trivializes this kind of practicing to cope with her being "different" from the others. All in all, her arguments and behaviour resulted in her not defying the existing gender order of her environment.

Women sometimes also practiced gender when they took the stage (or a leading role) in meetings. Humour was one of the ways through which they manoeuvred within the gender order. Though earlier observed instances of humour were mostly harmful to women, women themselves were also observed using humour for their own benefit. Several woman PhD students, for instance, gained the attention of and increased their visibility with the other (male) participants by taking over speech turns during discussions and making jokes:

> *The woman PhD student makes a joke about how certain tests will not be necessary anymore once she has done her calculations. The group laughs. The project leader responds jokingly, "oh then we are not needed anymore", referring to his department (of which the woman is not a member).*
>
> [Observation project CivEng1]

The observer felt during this particular meeting that this PhD student's jokes and casual way of interacting with the others rendered the atmosphere of the meeting less business like and more informal. One could say that she thus enacted the stereotype of women's interactional styles as interviewees had mentioned. However, she did this by violating gender norms. The joke, which made her own contribution superior, functioned as a way to do impression management and bond with the others, a form of contesting behaviour. The project leader then built on her joke in a supportive way (Holmes, 2006b), continuing the sarcasm. In a way, what she did here is 'risky', because using humour, especially aggressive humour, is considered less appropriate for women than for men as it is a traditionally masculine form of humour (Kotthoff, 2006). In so doing, she rewrote the 'gender subtext of organizing' and used humour to manoeuvre within the gender order (D. M. Martin 2004): "by violating norms and creating unconventional perspectives, humour influences norms" (Kotthoff, 2006, p. 5). Her violation of gender norms gave her visibility and voice in the meeting.

Moreover, women took the stage and gained voice by explicitly using gender for their own favour and benefit:

> *The woman project leader interrupts a discussion between men due to time constraints, saying "gentlemen".*
>
> [Observation project MechEng2]

> *The woman PhD candidate is presenting what she has been working on in collaboration with one of the industrial representatives. At one point, she approvingly talks about "the work of the men of [company]".*
>
> [Observation project MediPro]

We see here that both women explicitly yet without reflection identified and distinguished on the basis of gender, to their own benefit. In the first instance, the woman used the gender of the discussants to interrupt their conversation. Though her way of doing may be seen as gender-stereotypical, her purpose - interrupting - was not. The way she addressed them, using a respectful and hierarchical term like "*gentlemen*", attenuated the 'aggressive' move of interrupting. She thereby did not hurt the men nor her relationship to these men, yet in a polite manner established herself as being the one in control of the meeting. In the second instance, addressing the industry representatives as "*men*" was part of a compliment, to make their efforts visible to the scientists who are not involved with these persons. Though they emphasized the gender and not professional identity of the men, the women did not downplay the latter, through the use of a polite form of referring (first instance) or through explicitly linking the men's gender to the work they accomplished (second

instance). Both thereby draw from the gender practice that women are not supposed to be aggressive or direct towards others, but need to bring their messages in a attenuating and 'soft' manner.

In conclusion, women performed complex practicing of gender to manoeuvre in their male-dominated environment. They adjusted their attitude or behaviour to be included and fit within this environment, suppressed their resistance, or used humour and gender references to create a way to cope with the gender order. Their practicing resulted in either a reproduction (e.g. by negating its importance) or a challenge (e.g. gaining visibility by using aggressive humour) of the gender order.

Discussion and conclusion

In this chapter we aimed to build a better understanding of the practices of gender in interpersonal cross-gender networks in technological university-industry projects. We have looked at the actual practicing of gender, the unreflexive spatial-temporal accomplishment of gender practices, that has remained underresearched in studies of networking hitherto. We uncovered how networking practices intertwined with gender practicing in different ways. Participants mainly drew from culturally available gender practices, though their gender practicing sometimes also blurred or crossed the gender order (Bruni et al., 2004).

In his parable of the cave, Plato described how our view of the world is filtered and tenacious. His parable points to how we cannot see our world differently than as we are used to seeing it - until we are taken out of that vicious circle. Being used to seeing the technological world as it has been for so long, i.e. men dominated, people in that world may not see how this status quo came about, nor how it is sustained through their own behaviours. The strong association between masculinity and technology (Faulkner, 2001) contributes to a culture in which gender is perceived as invisible and irrelevant. Gender practicing studies such as ours take away gender's invisibility and legitimacy by showing its subtleties in everyday practices. Indeed, we found that the majority of project participants was limitedly reflexive regarding the role of gender and considered gender only as a marginally relevant issue, whereas our exploration of the practicing of gender showed that gender was in fact relevant to the project networking. Increasing the visibility of practices of gender and decreasing the legitimacy of inequalities as we have tried to do with this study, enhances the possibilities for change (Acker, 2006). Plato's parable tells us that what has been seen, cannot be unseen. Increasing the awareness of how gender impacts micro-level interactions between people may help them 'come out of their cave' and

be able to better reflect on their own gendered behaviours. When people in both industry and universities become more reflexive about their own gendered networking practices, a space opens up for them to change the way they practice gender when building networks, and as a result they may eventually reshape the predominantly masculine image and culture of the technological field.

Our fine-grained analysis of the intertwinement of gender and networking contributes to the organizational network literature and to the gender practice literature. Earlier studies showed the intertwinement of practices of gendering and networking, mostly through interviews. Our approach of networking as a practice that is not always intentional or reflected upon, has been able to add to those insights by capturing how this intertwinement is done in the moment. The ways in which the networks are composed, the perceptions of network members about the gender issue (e.g. taking the "men's world" for granted, "women only influence process"), and the networking done within the meetings (e.g. where masculinities are mobilized and women need to cope with that), render gender (issues) and sometimes even women (publically declaring "it's a man's world") invisible and deemed irrelevant in (and outside) the projects. Yet, the interactions in the networks show that gender is anything but invisible and irrelevant. Because the practicing of gender was done without much awareness, we have seen that participants routinely draw from those cultural gender practices that reinforce gender inequalities. Jocular remarks amongst men, for instance, turned out to be a way of practicing gender that resulted in the bonding of men while excluding the women (Holmes, 2006a). We argue that the many small momentary instances add up to a gender inequality that sustains the status quo of the technology field. As says Faulkner (2009):

> *Individually, these practices may not seem terribly serious and significant, but cumulatively they can amount to a dripping tap effect – with the result that it takes more work for those on the margins of the culture to build relationships needed to do the job and to get on in the organisation. (p. 15).*

This is in line with what (Valian, 1998) calls the "accumulation of advantage and disadvantage" (p. 3). This may hinder the inclusion of women in the technological innovation networks, their ability to participate on an equal footing, and their ability to add their perspectives that might bring technological innovation further. Making visible the subtleties of gendered microinteractions can help to undermine the legitimacy of gender inequality. A greater awareness of the link between micro-interactions and structures of inequality (Ridgeway, 2009; Nentwich & Kelan, 2014) may inspire people to do gender differently in their everyday interactions and thereby change gender inequality in the

technological field.

Our contribution to the gender practice literature consists of the identification of the practicing of gender in networking in relation to culturally available gender practices. Building on P.Y. Martin's (2001, 2003, 2006) important distinction between gender practices and practicing of gender, we were able to unravel how gender practices were reproduced or stretched and challenged by the spatial-temporal practicing of gender in that setting. Our findings show how gender practices that reproduce the gender order were activated in the practicing of gender, such as emphasizing the social qualities of women, expecting women to be a secretary, referring to men's physical strength, and men joking about women. Because this practicing is largely invisible, taken for granted and for a large part non-reflexive, the gender order is routinely reinforced. However, some instances of the practicing of gender also gave room for countering the existing status quo. We saw this when women manoeuvred within the gender order, but also in other categories of practicing. Some participants were indeed aware of the need for more women in the field and men supported women's presence in the networks. Women enter the largely masculine order of the field, and have to relate to a professionalism that is constructed according to masculine norms and values. Our analyses of the practicing of gender showed how some women built ties with other women, and how women took the stage, sometimes by using humour or referring to the men's gender to their own benefit. We note how women are more reflexive of their and other people's gender practicing than people who are more privileged, in line with Acker (2006) and P.Y. Martin (2003).

A second contribution to the gender practice literature concerns the seemingly central role of humour in the practicing of gender through networking practices. Humour produced the in- and exclusion of people when they "joke at the expense of others (exclusion) and thereby reassure themselves of shared values and perspectives (inclusion)" (Kotthoff, 2006, p. 15). Our findings show that humour is used for both reproducing and countering the gender order. Jokes were made directly or implicitly on gender, and different forms of humour were used for bonding, coping, gaining visibility, or going against masculinities. It eased talking about socially sensitive topics, such as gender, because the ambiguity of humour enables talking about things in disguised and deniable form (Crawford, 2003). We showed that besides the function of humour as doing gender in an (unintentionally) harmful and exclusionary way, it was also used (by women) to cope with harmful practices and paradoxes of double binds (D. M. Martin, 2004). As Holmes (2006a) notes, women can use humour to modify, contest and subvert gender stereotypes in subtle ways. Humour allows women to negotiate new meanings, which enables them to try and change the

gender order of their organizations (D. M. Martin, 2004). This role of humour is underexposed in studies of the practicing of gender in organizations and of networking, and future research could further these insights.

We conclude that attending to the practicing of gender in networking is a fruitful way to identify when and how gender is practiced in the 'heat of the moment' when people work on building their interpersonal networks. This provides us with clues as to how the gender order is reproduced, but also identifies the spaces and moments in which gender can be practiced differently. Networking is important not just for university-industry interactions, but for many other aspects of organizational life, e.g. for finding a job (Wanberg, Kanfer, & Banas, 2000), building careers and work performance (e.g. Emmerik et al., 2006; Forret & Dougherty, 2004, 2004), ascent to top positions (Brass, 1985), managerial accomplishments (e.g. Michael & Yukl, 1993), or the development of innovation (e.g. Valk & Gijsbers, 2010). Growing reflexivity and awareness of the potentially detrimental but also constructive ways in which gender is practiced at the micro-level, may help people to practice gender differently when they build relationships, which is an important step to eventually increase gender equality at the macro level in all kinds of organizational networks.

Negotiating networks and transferring ties:

an examination of how practices of networking propel network dynamics

Abstract

The aim of this chapter is to explore the recursive interplay between networking practices and network structures. We do so to gain insight in how network dynamics come about. For this purpose, we combine the practice approach to networking as developed in this dissertation with a structural approach to networks. We identify and analyse three networking practices - network negotiation, network transfer, and tie hibernating - to examine how they impacted the network structures of multiple university-industry collaboration projects, and how they were enabled or constrained by those structures. The approach we propose in this chapter, an alternative to structural accounts of network dynamics, makes four contributions to knowledge on network dynamics. First, it provides insight in how those dynamics are the result of the constant interplay between networking practices and network structures. Second, it teaches us how interpersonal and inter-organizational network structures of university-industry collaboration projects inherently and dynamically cross-link. Third, we learn from this approach how network dynamics are a political phenomenon. And fourth, the study helps to better understand how networking practices and project outcomes interrelate.

Key words: *networking practices; network dynamics; practice approach; university-industry collaboration*

> *If the person in the meeting is not directly the right person, then he can say, 'my colleague'...and that is how you can expand your network…if it's about the topic and someone says, that company is also good at that, and I know them and they might be able to do something' - that happens sometimes, that a new company joins the users' committee, or a new user, brought in by a company or someone else in the meetings.*
>
> [Assistant professor, project MechEng3]

This quote points to the processual, evolving, dynamic nature of networks, the action-reaction and snowballing effect that render networks to 'move' continuously. Interviewees implicitly or explicitly referred to this notion of networks when asked what networking is in the context of the university-industry collaboration projects. In this chapter, this dynamic nature of networks is centre-stage.

Introduction

Using the practice approach in combination with a critical diversity perspective to explore networking in-depth, we have seen in the conceptual chapter and the power and gender chapters what networking practices constitute and what shapes them: we have seen how people within the university-industry collaboration projects build relations within the framework of their identity and practice-nets, to enact power and get things done, with their own interest and (/or) the project interest in mind, and how networking practices can be gendered and reproduce or challenge gender inequalities in the projects and the larger technological field.

What we have not done yet, is combine this approach of networking as a practice with the more mainstream notion of networks as structures. We have not studied in-depth yet how networking practices are related to the project network structures, i.e. what the consequences of these practices are for the network structures and how those structures impact networking practices. That is the main purpose of this chapter. It is our aim to explore the recursive interplay between networking practices and network structures, to give insight in how network dynamics come about. For this we use and employ the concept of networking as practices as developed in the previous chapters. We try to answer the question *how, in the case of university-industry collaborations, networking practices change or stabilize interpersonal network structures and how those network structures enable or constrain those networking practices*. As such, we build an in-depth understanding of how network dynamics come about and how those dynamics drive the collaboration projects forward.

To do so, we take a longitudinal perspective and study the network structures and networking practices in six university-industry collaboration projects over a period of two and a half years*. We contend that taking one 'picture' of the network's structure at either the beginning or end of a project cannot give us a complete understanding of how scientists, industry representatives, and funding agency officers build ties and contribute to project outcomes. We therefore take multiple pictures and study what happened between those pictures – in other words, composing a network 'film'. This enables us to see how and why participants in the course of the projects built (or refrained from building) relationships with one another, and how those networking practices impacted the project network structures and the project progress and outcomes. More specifically, we explore for three networking practices done in multiple projects how they were impacted by and how they had an impact on the interpersonal network structures of the projects. Additionally, we examine how the practices had an impact on the progress and outcomes of the projects, to connect the networking practices and dynamics to the benefits gained by the project participants from their networks and the resulting process of innovation development in the projects. Together, these analyses help us to advance our understanding of how networks are dynamic, and how networking practices propel these dynamics.

Following, we will first attend to the literature background of this chapter, reviewing earlier research on network dynamics. We elaborate on the practice approach that we apply to study the networking practices in the exploration of the network dynamics of the university-industry collaboration projects. We then continue with an explanation of the research design and methodology. This is followed by the presentation and analysis of three networking practices in relation to project network dynamics. We end with a discussion in which we expound on the theoretical implications of the analyses, showing how network dynamics are a dual, multi-level, political, and outcome-driven and -generating phenomenon, and conclude the chapter.

* *We view our study as longitudinal as it follows the same cases over a period of time to track events and changes in the networks and projects. The time frame was restricted by the possibilities of the duration of the PhD project.*

Literature background

Research on network dynamics

A growing stream in organizational network research focuses on dynamic accounts of organizational networks (Brass et al., 2004). Authors speak of network stability and change, network persistence and dynamics, or network evolution to indicate that networks are processes that are "fluid and subject to change" (Van der Hulst, 2011, p. 261) rather than static entities. A dynamic view of networks questions the sustainability of network positions and is important as the understanding of network outcomes is "incomplete and potentially flawed without an appreciation of the genesis and evolution of the underlying network structures" (Ahuja, Soda, & Zaheer, 2012, p. 434). A dynamic view requires longitudinal network analyses, which is increasingly done in network research (Snijders & Doreian, 2012).

Empirically, network dynamics have for a large part been studied on the firm level or higher, in (mostly US-based) sectors such as biotechnology (Powell, Koput, & Smith-Doerr, 1996; Owen-Smith, Riccaboni, Pammolli, & Powell, 2002; Owen-Smith & Powell, 2004; Powell, White, Koput, & Owen-Smith, 2005), the chemical industry (Ahuja, 2000), the cellular industry (Rosenkopf & Padula, 2008), or the Broadway Musical Industry in comparison to several scientific disciplines (Guimera, Uzzi, Spiro, & Amaral, 2005). These studies used different sources to examine the changes and stabilities in network structures, such as formal collaboration agreements (Powell et al., 1996), patent activities (Ahuja, 2000), or journal publication collaborations (Guimera, et al., 2005). Going down a level, several scholars have studied network dynamics on the interpersonal level (Burkhardt & Brass, 1990; Burt, 2000; Thune, 2007), and some explicitly connected the interpersonal network level to the inter-firm level (Checkley & Steglich, 2007; Moody, 2004; Demirkan, Deeds, & Demirkan, 2013). These studies used questionnaires, publications, or interviews as techniques of data collection to explore interpersonal network dynamics.

We observe two areas of interest in the research on network dynamics that need further exploration: the role of agents and their engagement in networking practices in network dynamics, and the relation between the interpersonal and organizational network levels in network dynamics.

Role of agents in network dynamics We notice that studies on both inter-organizational and interpersonal network dynamics are largely based on quantitative-oriented research designs. The emphasis is on analyses of structural changes and stabilities, studied through (statistical) 'pictures' of networks over time. This approach however leaves out how people purposefully and actively work to build relationships for their own benefit or that of the network

(Ahuja et al., 2012; Kilduff & Brass, 2010). The usual way of doing network research tends to neglect processes of reciprocal causation and co-evolution of individuals and the networks within which they are embedded (Ibarra, et al., 2005). Networks are seen in general as contexts that provide opportunities and constraints for actor's behavior (Borgatti & Foster, 2003, p. 1000). Structural determinism is prevalent in network research (Kilduff & Brass, 2010), which implies a "curiously static and passive approach on the part of these actors with respect to the network itself" (Ahuja et al., 2012, p. 442). The individual in the context of the larger network picture (Ibarra et al., 2005) and the creative role of actors in developing, creating and sustaining networks (Swan, Scarbrough, & Robertson, 2003), has been hard to capture in network research (Ibarra et al., 2005). Knowledge of this link on an interpersonal level is underdeveloped as the agency - structure debate still has to become a driving force in social network research (Kilduff & Brass, 2010; Kilduff & Krackhardt, 2008; Kilduff & Tsai, 2003; Manning, 2010; Stevenson & Greenberg, 2000). Relatively little empirical research exists on how individuals control and make choices concerning the social networks that facilitate and constrain their actions (Kilduff & Brass, 2010). We thus need more knowledge on how people use, adapt, and change their networks of relationships (Ibarra et al., 2005; Kilduff & Brass, 2010), i.e. how networking practices and network structures relate.

The key to understanding network dynamics is to zoom in on concrete interactions and networking practices, so as to build more knowledge on the emergence and change of network structures (Hollstein, 2011) and provide an alternative to structural determinism. Network structures are not only enablers and constraints for behavior (Kilduff & Brass, 2010), but are also the result of and evolve because actors engage in agency and use their network ties for their own advantage. It is critical to recognize and explore this role of agents and their networking practices, as "some deliberate network-modifying actions by network actors in the present may have consequences for network structure later" (Ahuja et al., 2012, p. 435). Following this, we propose to put more emphasis on the construction of network 'films': a research approach that brings together networking practices done by individuals and their network structures into the study of network dynamics.

Linking interpersonal and inter-organizational levels The second area of interest yet to be explored in research on network dynamics is the relation between different levels of networks. Former studies on network dynamics are focused for a large part on either inter-firm networks or interpersonal networks. We contend that studying network dynamics with the use of a practice and structural approach can provide insight in the intersecting of those two levels as they are inextricably linked, and on how this intersecting is inherent to

network dynamics. In their study on the development of network ties in the US biotechnology field, Powell, White, Koput, and Owen-Smith (2005) state that the key to understanding a highly interwoven system such as the field of biotechnology is "to relate the behavior and dynamics of the entire structure with the properties of its constituents and their interactions" (p. 1139). We contend and explore in our study how this is also true for the 'micro-level' of networks: zooming in on the activities of networking at the interpersonal level and the consequences for network structures at interpersonal and inter-organizational level will bring a more comprehensive understanding of the basis and dynamics of inter-organizational ties.

Networking practices are done on several levels: between dyads and triads of people, but also whole group activities (such as meetings, see also chapter 2). These practices are, we argue, informed by network positions and structures, as well as induce network reproduction or changes at the level of the whole network. Additionally, a multiple-level networking analysis contributes to our knowledge of how interpersonal networking relates to ties at the inter-organizational level. To our knowledge, this explicit linking of the interpersonal to the inter-organizational level is rarely done, even though (inter-)organizational networks are at the basis built and instantiated through relationships between persons (Jolink & Dankbaar, 2010). (Inter-) organizational ties can also supersede interpersonal relations, for instance when inter-firm ties remain even though managers move to other firms (Checkley & Steglich, 2007). Using the networking as practice approach helps us to better understand the relations between these levels.

Networking as practice

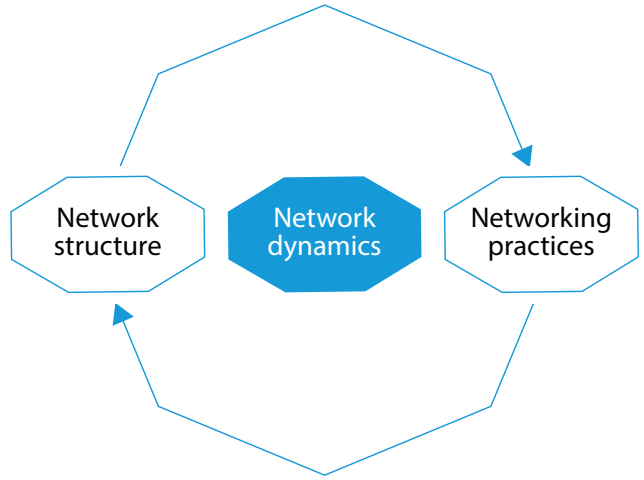
To study network dynamics, we use the notion of networking as a social practice as developed in this dissertation. To do so, we define and study networking practices as "structurally embedded, dynamic, socio-political actions of people when they enter, build, maintain, use, and exit their relations at work". As explained in chapters 1 and 3, Giddens (1984) aimed to link agency to structure through his notion of structuration: through their engagement in social practices, people either reproduce the structures of their social systems, or they challenge them, resulting in the stability or transformation of the social system as a whole. Though Giddens' theory is about society at large, its ideas can be applied to the study of network dynamics. Hence, where in previous chapters we spoke of structure in the sociological sense (i.e. following Giddens' structuration theory, 1984) – practice-nets and identity, social systems, gender order - in this chapter we focus on structures of networks, i.e. examining the configuration of nodes and their ties (Brass, Galaskiewicz, Greve, & Wenpin,

2004). The notion of networking practices combines agency and structure in networks. People work on their interpersonal relationships based on prior network structures and positions, which reproduces or changes network structures. How people do so and how that affects their network structures is what we explore in this chapter. We see people's network practices in that sense as the "engines of stability and change in the macro structures that define or constrain social networks" (Ibarra et al., 2005, p. 368).

Practice research fits well with the longitudinal research design required to study network dynamics. The approach enables the examination of routines within networks, how network members' learn to cooperate together within their networks and create trust that allows them to work efficiently together (Demirkan et al., 2013). In addition, the approach enables us to not only study the repeated interactions, as is common in network research (Brass & Burkhardt, 1993), but also take into account the one-time or incidental interactions on the interpersonal level that can be critical for the continuity or change of a network. The approach furthermore steers us to examine not just one activity at a time, e.g. 'being friends with' or 'asking for advice', but multiple activities simultaneously. Examining what people actually do in practice reveals the uni- or multiplexity of their ties - the combination of multiple types of ties in one relationship (Phelps, Heidl, & Wadhwa, 2012), e.g. when a person gives a material to another person, this goes together with advice on how to best apply the material, which is at the same time knowledge sharing.

In brief, in this chapter we aim to study the recursive interplay between networking practices and network structures to build a better understanding of network dynamics. For this purpose, we examine how, within university-industry collaborations, networking practices change or stabilize network structures at the interpersonal level and how they are enabled or constrained by those structures. Combining and confronting a practice approach with a structural analysis of networks in the study of network dynamics, we build a multi-level account of network dynamics and build insight in the relation between network dynamics and project outcomes, in the form of actors' benefits and the outcomes of the network as a whole. We do so through a multiple case study of university-industry collaboration projects, as we explain in the next section. In short, the basic notion of network dynamics we explore in this chapter can be visualized as following:

Figure 5.1: Basic notion of network dynamics: interplay of network structure and networking



Research design

To build a better understanding of network dynamics, we used a case study approach. Studying networking dynamics through networking practices requires the following of actors over time within their own context. To be able to do so, we needed longitudinal, process-oriented, qualitative research (Phelps et al., 2012). Case studies can facilitate this type of research. Case studies are also very suitable for conducting multilevel analysis (Eisenhardt & Graebner, 2007). Our cases were the six university-industry collaboration projects that formed the empirical basis for this dissertation. See table 5.1 for an overview of the cases.

Data collection

The projects were followed from September 2011 to January 2014, through interviews in the first six months of this period, and observations of meetings and the study of documents such as minutes and progress reports throughout this period. We round up the data collection with a survey distributed in January 2014 among all persons involved in all six projects, to assess the (perceived and preliminary, as not all projects were finished) outcomes of the project. We also needed to determine the network structures of the project, for which we conducted social network measurements at two different points in time, at the beginning and end of the data collection period.

We combined the qualitative part of the case studies with a Social Network Analysis of the project network structures, which is used for mapping the

relations that exist in networks and is as indispensable to study network dynamics as the qualitative part. This mixed method design improves the explanatory power of our analysis: "incorporating qualitative and structural data provides a way of linking theoretical perspectives that either focus on structure or agency" (Hollstein, 2011, p. 413). To examine networking practices, "traditional social anthropological methods [of observational techniques and in-depth interviewing] are most valuable" (Hollstein, 2011, p. 407), and indispensable, we would argue. This combination of data collection techniques enabled us to perform a multilevel analysis, linking network actors and their networking practices to changes and continuities in the project network structures, and to the projects' progression. This gave us insights in the constitution and dynamics of the project networks (Hollstein, 2011).

Table 5.1 Overview cases

Name project	Participants	
MechEng1	· Project leader	· Other
	· 3 Fellow project applicants	· Program officer
	· 3 Executive researchers	· Management Assistant
	· 5 Industry representatives	
MechEng2	· Project leader	· 9 Industry representatives
	· 3 Fellow project applicants	· Program officer
	· 2 Executive researchers	· Management Assistant
MechEng3	· Project leader	· Other
	· 4 Fellow project applicants	· Program officer
	· 2 Executive researchers	· Management Assistant
	· 6 Industry representatives	
MediPro	· Project leader	· 5 Others
	· 3 Fellow project applicants	· Program officer
	· 3 Executive researchers	· Management Assistant
	· 6 Industry representatives	
CivEng1	· Project leader	· Other
	· 2 Fellow project applicants	· Program officer
	· 4 Executive researchers	· Management Assistant
	· 12 Industry representatives	
CivEng2	· Project leader	· 2 Others
	· 2 Fellow project applicants	· Program officer
	· 3 Executive researchers	· Management Assistant
	· 15 Industry representatives	

Interviews

In the first six months of the data collection we interviewed around eight persons for each project whom we identified as key players in the project. These people played different roles in the projects: the project leader (university professors), a fellow project applicant (university professor), executive researchers (PhD students and post docs), the funding agency's program officer, and industry representatives, to indicate their role in the project. We interviewed 52 projects participants in total. At this time, all projects were in their first half, with some having had only one or two project meetings. Topics discussed during the interviews were the participants' entry into the project; goals and expectations; diversity issues; the concept of 'networking'; suggestions for improvement of the project. See Appendix A for a complete interview guide.

An important element of the interviews was to conduct the first network measurement at t=0. For this purpose, we used a socio-metric list and asked the key project participants to indicate for all participants whether they knew these people before the project, whether they had contact concerning the particular project, and if so, through what media and with what frequency. We used these to map the network ties between these key players in the projects. From the answers of the interviewees we can derive whom they only saw during project meetings, whom they say regularly, and whom they saw from time to time – outside of the meetings. It is a limitation of this study that we did not conduct a network analysis of the whole project network structures, which makes it more difficult to derive robust conclusions about these network structures from our study. We need to be cautious in our claims regarding this first network analysis, as not all project participants were interviewed, but only the ones we identified as key players (about half of each project). Not all mentioned contacts could therefore be checked for reciprocity, and the network structures we built from the measurement were incomplete. Yet as we interviewed key players, our network analysis can give a tentative indication of how the project networks were structured. Finally, before the survey was distributed, short update interviews were held with the project leaders of three projects of which we had not recently visited a meeting, to gain their perspectives on the progress of the projects.

Observations

We conducted 22 observations of project meetings in total for all six projects combined. See Appendix B for an overview of the initial observation guide. In the observations we paid particular attention to moments in which the inclusion of people or companies were debated, to moments in which the project network was explicitly mentioned and discussed, the input provided by participants –

scientists, industry representatives, and funding agency officers - during the meetings, and the socializing before, during and after the meetings. During the observations, we also held informal conversations with participants to discuss their perceptions of the progress of the projects. On the basis of these observations we were able to gain a general picture of the centrality of the different participants in the projects and a sense of the characteristics of the relationships between them. We used the observations in combination with the information we gained from the interviews and from the documents to build a comprehensive understanding of the development of the relationships in the projects.

Document study

To build a comprehensive account of each case, we also studied documents related to the projects. The *application documents* gave an insight in the goals of the projects, background and networks of the researchers, and the (projected or promised) added value for practice. The *letters of support* that were part of the application documents and written by industry partners showed the goals for participation of and input provided by the industry partners. The *minutes* of project meetings helped us add to our observations and understand the networking done within the project meetings and outside of them, and gave insight in the (substantive) progress of project. *Progress reports* sent before each project meeting held information on the scientific networking, progress of the research, and collaboration with industry. Finally, the *PowerPoint presentations* from the meetings were sometimes sent around by the researchers, and gave further information on the scientific networking, progress of research, and collaboration with industry.

Survey

For an understanding of the perception of the project participants of the projects' development and outcomes, and to measure the network structures at t = 1, we distributed a survey among all participants of the projects in January 2014. The survey was set up based on both the data collected through the interviews and desk study, as well as on network literature. The survey consisted of two parts, one entailing the network measurement questions, and one for the evaluation of the projects, consisting of questions about project goals and goal achievements, and statements regarding the interactions within the projects. In appendix C1 it is explained in more detail how this survey was set up.

The survey was set up via the online questionnaire software Qualtrics and was sent to all project members using the most recent project participants lists, through personalized emails. We explained in this mail what the goals of the

survey were, requiring responses of preferably all participants, and explained that the survey could not be made anonymous due to the nature of the network measurement. We sent a reminder email two weeks later to the people who had not yet responded, with a similar message. In total, we received 83 responses of the 116 people approached for the survey. This is a 72% response rate. Note that we counted the same person twice in case they participated in multiple projects. In table 5.2 we provide an overview of the respondents according to function in the project.

Due to time constraints we were not able to conduct a pre-test among (potential) respondents, unfortunately. As an alternative to enhance the reliability and validity of the survey, we asked several colleagues with experience in questionnaire building and network analysis to test the survey and provide us with feedback on the questions. We adjusted the survey according to their comments.

Table 5.2 Overview respondents survey

	Frequency	% of total party population	% of total respondents
Projectleader	6	100	7.2
Fellow project applicant or supervisor	14	87.5	16.9
Industry representative/ member of the user's committee	36	68	43.4
Executive researchers (PhD/postdoctoral fellows)	17	100	20.5
Funding agency's program officer	6	100	7.2
Others involved:	4	33.3	4.8
Total	**83**		**100.0**

Measurement reflections

Regarding the network measurements, accuracy, measurement error and reliability are important concerns (Wasserman & Faust, 1994). The question of informant accuracy implies that relying only on verbal reports may give a distorted image of the network structure under study. In this study, we compensated for this issue of potential inaccuracy through the triangulation of the network measurements in the interviews (at t = 0) and the survey (t = 1) with the observations of project meetings and document analysis. This enabled the comparison and verification or further elaboration of the network data with what we saw happening in the projects and thereby contributed to building a more comprehensive account of the networking and network structures.

Collecting network data through fixed choice techniques holds the risk of measurement errors, i.e. not gaining a complete picture of a network. We compensated for this at t = 1 by including both a list of project participants (socio-metric measurement) and provide an open space for respondents to include people who were not on the list, also explicitly mentioning this option in the network question. At t = 0 a list of project participants was given as well, and interviewees often mentioned people not on the list who in fact were also included in or at least related to the project networks.

Finally, reliability is an important concern here. At both t = 0 and t = 1 we used socio-metric questions instead of a fixed choice design, which increases the reliability of the measurement (Wasserman & Faust, 1994). Moreover, we indicated in the graphs of both t = 0 and t = 1 the ties that had been reciprocated, which points to the reliability of those answers. However, as said, for t = 0 we did not interview all project participants, which results in only partially representative network graphs. As the key actors of each project were interviewed, we do believe the graphs of t = 0 provide a sufficient indication of the network structures at that point in time. Concerning the survey, we can see from table 2 that all project leaders responded, as did all executive researchers and funding agency's program officers who were involved in the six projects under study. Although the majority of fellow-project applicants (professors) gave their responses to the survey, a few did not despite the personal approach and personal reminders. This applies also to the 32% of the industry representatives who did not respond. A note should be made here that some companies were represented by multiple persons who were counted and approached for the survey as separate industry participants, of whom only one representative participated in the survey. Relative to the total population of the projects under study, the industry representatives were thus underrepresented in the pool of respondents, and so was the group of 'others involved' – scientists asked to participate in the project as advisors or technical support staff at universities. The management assistants of the funding agency were not able to fill in most of the questions as they were content-related, and decided to withdraw from the survey. For the current study, these distortions imply that not all actors could be brought into the network analysis at t = 1.

Data analysis

We conducted the analysis in several steps. We first constructed an account of the set-up, important events, and networking practices in the individual cases through an in-depth analysis of each case (Eisenhardt, 1989). We then compared the stories of the six cases, to find patterns and differences in practices and structural changes and continuities.

In-case accounts

For each individual case, we took several steps to build an in-depth understanding of the networking practices, changes and continuities in network structures, and project progress. First, for each project we put all documents, interviews, and observations in Atlas.ti to build a chronological account of the project (i.e. making a 'network film'). Generally speaking, this included the history of the project, the set-up, the inclusion of industry and researchers, and accounts of what happened network-wise and other important events, during project meetings and outside of them.

Second, we manually drew network graphs for t = 0 based on the available data from the interviews at the beginning of the data collection. These data were not neatly organized in categories but embedded in narratives, which required interpretation while drawing the pictures. We drew a line between actors for each mentioned contact, and indicated the frequency of the contact through drawing broken or continuous lines, i.e. "daily/weekly/regular" (broken lines) and "monthly/from time to time" (continuous lines). We thickened the line when a tie was reciprocated. With the limitations of our data in mind, from this network graph we were able to indicate who were central actors in the networks, who were peripheral, strength of ties, and where the network had subgroups.

The third step included drawing network graphs based on the survey, for the network structures at t = 1. We used the data on "contact about the project, outside of the project meetings", as we were interested in the contact network structures regarding the projects under study. We drew a line when a contact was reported, and thickened the line when it was reciprocated. Then, to indicate the strength of ties we used frequency of contact to examine and compare at t = 0 and t = 1 (following Reagans & McEvily, 2003). We added the frequency information besides the lines - daily (4), weekly (3), monthly (2), once (1) - and drew broken lines for the ties that were daily, to indicate more clearly where the strongest contacts were in the networks. Keep in mind that these frequencies are not completely similar to the frequency numbers of t = 0, due to the differences in questions asked in the interviews. We also made an overview of the contents of those contacts in an Excel sheet based on responses the survey.

Furthermore, we calculated the centrality of actors and estimated the density of the networks. For centrality, we established the node in-degree of each actor. The in-degree of a node is the number of nodes adjacent to that node and is a measure of receptivity, or popularity (Wasserman & Faust, 1994, p. 126). We calculated this by counting how many times actors were selected by other actors for contact. Density is related to the proportion of lines in a graph as a whole (Wasserman & Faust, 1994, p. 101). We derived the density of the networks through examining the network graphs at t = 0 and t =1 and

examining where in the graphs a higher number of (reciprocated) contacts and high frequency were located regarding contacts outside of the project meetings.

Network studies have many well-developed and sophisticated measures for studying different network characteristics at their disposal, yet for making our argument in this chapter we only required these basic network measures. Drawing the network graphs and making these calculations allowed us to get an indication of who were central actors in the networks, who were peripheral, the strength of ties, where the networks were dense, and what was exchanged in the network, and whether and how that changed or remained the same over time.

Fourth, we compared the network graphs of t = 0 and t =1 for each project to look for similarities and differences that indicated what changes had occurred and what continuities could be detected in the network structures over time. We asked the following questions:

- Did actors get out of the network? Did new actors enter the network?
- Which people gained or lost centrality in the project network?
- Were new ties built between actors? Were ties dissolved?
- Did existing ties grow stronger or weaker?
- Did the shape of the project network (based on density measure) change during the project?

The fifth and last step was to bring this network analysis and our qualitative knowledge of the networking practices and project progress together. For instance, as we noticed some actors appearing at t = 0 did not appear at t =1, we were able to explain these disappearances with knowledge from interviews and observations: people retiring, being transferred to other positions within their company, or a PhD candidate leaving. Or we saw strong triads between researchers, which could be explained for instance by the division of tasks in the project, or for example by the fact that one of the actors had been a former student of the other two, before becoming a representative for a company in the project. This account of each network then enabled us to conduct a cross-case analysis.

Cross-case analysis

We used the in-depth case studies to conduct a cross-case analysis. First, to gain a general overview of the network structures in the different projects, we compared the structures of all project networks and looked for similarities in changes and continuities to uncover patterns of network dynamics. Roughly, in all projects we see the same shape of network at t = 0: the network structures were 'heavy' on the side of the researchers, with which we mean that in that part of the network the people had more frequent contacts. The people who seem to be central are either the project leader or (one of) the executive researchers,

with the exception of project CivEng2 in which an industry representative seemed central besides the project leader. The network structures were 'lighter' in that sense between researchers and industry representatives, and between the industry representatives, as the contacts regarding the projects were less frequent between those groups. We furthermore compared the network graphs including and excluding the project meetings. This comparison showed us that the contacts between industry and researchers concerning the particular projects seemed to be mainly centred around the project meetings and related communications.

Comparing the network structures from the six projects at t = 1, what we generally see is that the persons with the most in-degree centrality were the project leader, PhD students, and fellow-applicants. This means that they were most often chosen by others as persons with whom they had been in contact about the project outside of the project meetings. The persons who were chosen the least, hence who had the least in-degree centrality were always persons from industry, and once a program officer from the funding agency. What we also see when comparing the network structures is that the most and most frequent contacts were between the researchers (daily, weekly, monthly). The contacts between researchers and industrial partners were mainly one-time events or monthly. This all seems to suggest that in general the network characteristics of the project network structures had not changed strongly over the course of the two years in between the two measurement moments. Furthermore, the program officers of the funding agency mostly were in contact with the project leader, fellow applicants and sometimes PhD students. The program officers seemed to rarely have contact with industry partners about the projects outside of the project meetings. Finally, we see in all projects that people left, new people came in, people were replaced, people changed function, or the frequency of contacts changed. Some people became or stayed isolated, others became more central.

Going back and forth between observations, interviews, surveys and the network analyses, we uncovered three networking practices in relation to structural changes or continuities that occurred in multiple projects, as we will illustrate below. See frame 5.1 for an overview. These three networking practices allow us to better understand and illustrate why and how project network structures changed or remained stable, i.e. to understand what network dynamics in the projects entailed. We do not claim that this list of networking practices is complete, nor do we seek it to be so. The goal of practice research is not to find a complete list of practices that entails 'work', in this case, 'network', but to understand what people actually do and say in their work and thereby build knowledge on how ways of working are reproduced or changed, in this case how network ties are reproduced or changed, i.e. network dynamics. As

such, these three practices are able to well illustrate how networking practices and structural changes and stabilities interplay.

Frame 5.1 Networking practices

Network negotiation is the practice of jointly deciding upon and setting conditions for the in- or exclusion of participants in the network.

Network transfer is the practice that entails a personal change of a node: when a person replaces another person in the same function in the network because that person is leaving the project for person-specific reason (e.g. a change of project leader), then that replacing person needs to 'adopt' the already existing network connected to that position. The network is hence "transferred" from one person to the other.

Tie hibernating entails the (temporary) under- or non-utilization of existing network ties. We have called this hibernating as the tie is present, but latent, not activated for at least a particular period.

As an example of how we reconstructed the networking practices, let us explain how we found the practice of 'tie hibernating'. Through the network analyses we found changes and continuities in the network structures of t = 0 and t = 1, such as how in the projects a skewed density in the network toward the side of the researchers remained. We attributed this continuity of skewness to be (partially) the result of the fact that some network relations between university researchers and industry representatives were never really activated - meaning that ties were present (e.g. industry representatives were officially and formally included) but not actively employed or used - some industry representatives, for instance, rarely showed up at project meetings. In addition, and similarly, from the observations, interviews and the survey we learned that it had been a goal in five out of six projects to have strong cross-linkages between the executive researchers, i.e. the PhD candidates and postdoctoral fellows. However, the bonds between them in reality had not been employed or used optimally, leading respondents in multiple projects to mention in the survey that the linking between the researchers could have been (much) better or smoother. Seeing the similarities between these two situations – in which ties are officially present (and desired) but are not actually used - we named this the practice '*tie hibernating*', to emphasize the dormant character of this activity-that-is-not-really-an-activity.

We found the networking practices to be specifically related to time, which is an essential aspect of network dynamics (Ahuja et al., 2012). Time is relevant in any study taking agency into account, as we learn from Emirbayer and

Mische (1998) who developed the argument that agency has a past, present, and future. Networking is always done in the present, with a certain future in mind, and, as we will see, is usually based on or embedded in ties from the past. Network negotiation is engaged in to ensure a certain future for the current network. Network transfer is a mechanism to transfer a past network to the present and to guarantee its continuance in the future. Tie hibernating is the maintenance (but not currently active employment) of a network for possible future purposes.

After we distinguished these three practices, we analyzed each practice by asking the following questions: what does the practice mean for changes and continuities at the interpersonal level, e.g. node changes, tie changes, or at the whole network; what do these changes and continuities mean for the ties at the inter-organizational level; and what is the consequence of all this for the progress of the project? Applying these questions in the analysis of the networking practices, we were able to build a comprehensive understanding of how the networking practices conducted at the micro-level drove the network dynamics of the different university-industry collaboration projects.

Findings

In this section we elaborate on the three networking practices that resulted from the analysis of the empirical material. We first discuss a practice that dealt with the in- or exclusion of new companies and their representatives in the networks, *network negotiation*. We then proceed with the replacement of actors to secure the continuance of inter-organizational ties, which leads to the practice of *network transfer*. The third practice is *tie hibernating*, which revolves around present but dormant ties. For each networking practice we describe one or two instances and explore how the practice related to the changes or continuities that we observed in the network structures between t = 0 and t = 1. We analyze the impact of those instances on the interpersonal network structures of the projects, and how those structures enabled or constrained those practices. We then analyze how the practice impacted the inter-organizational ties, and how the practice related to the progress and outcomes of the projects.

Network negotiation

Network negotiation is the practice of jointly deciding upon and/or setting conditions for the in- or exclusion of participants in a network. This practice explains changes in project network structures through the addition of industry partners to the networks between t = 0 and t = 1, or accounts for the continuity of a project network's composition as it currently is. We discuss and analyze

an instance of both of these outcomes of network negotiation to show the similarities and varieties in the performance and consequences of this practice.

Student-turns-industry representative

The first negotiation practice comes from project MechEng3.

Interpersonal structures We see in the network graph of the contacts outside of the project meetings at t=1 (figure 5.2a) of this project that between Ind. Rep. 8 (a new person representing a new company in the project), a professor (Prof2), and one of the PhD students (PhD2) a reasonably strong triad existed – the three ties are reciprocated and have relatively high values of contact frequency. Ind. Rep.8, the new person and the company he represented, was absent from the project network at t = 0 (figure 5.2b).

This change between t = 0 and t =1 was for an important part the result of the practice of network negotiation. In the project, a master student worked on the development of a tool as his graduation project, supervised by one of the PhD students (PhD2). During one of the project meetings, his professor (Prof2) told the rest of the project group that the student had found a job within a company. When group extension became a topic later during the meeting, the professor used his position as one of the leaders of the project to propose to include the student as a representative for that company within the project. The funding agency's officer asked whether contacts already existed with this company, which the professor confirmed. The officer also gave the only other industrial representative present the chance to influence this decision by asking whether he agreed with that inclusion. That representative halted the inclusion of the new company as he wanted to wait until an ongoing patent process related to the project was finished, and then possibly other organizations could join. The program officer proposed, while that process still ran, to include the student as 'involved', not as a 'user' (the official name given to industry representatives in the funding agency projects) possibly to keep the student formally included, but not yet give him the formal position of industry representative with its right for providing input and demanding applicability of results and IP issues. The question popped up whether the new company was a direct competitor for the already present company, but this was not the case according to that representative, as its focus differed. In the following meeting, when the patent process had already been cancelled and no Intellectual Property or competition issues remained, the ex-student was included as his company's representative (becoming Ind. Rep8).

This discussing of terms under which the ex-student and the company he represented could be included in the project is a good instance of network negotiation. We see here how the prior ties between the student, professor, and PhD student and the subsequent network actions of the professor, the program

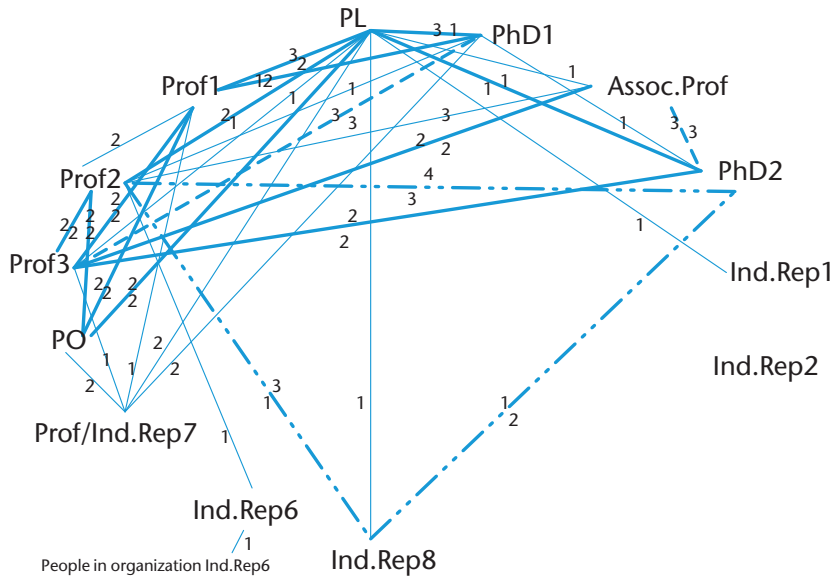


Figure 5.2a. *Network graph of project MechEng3 at t = 1. The numbers beside the lines mean: 4 daily, 3 weekly, 2 monthly, 1 one-time. The broken lines indicate the triad between a student-turned-industry-representative, a professor, and a PhD student.*

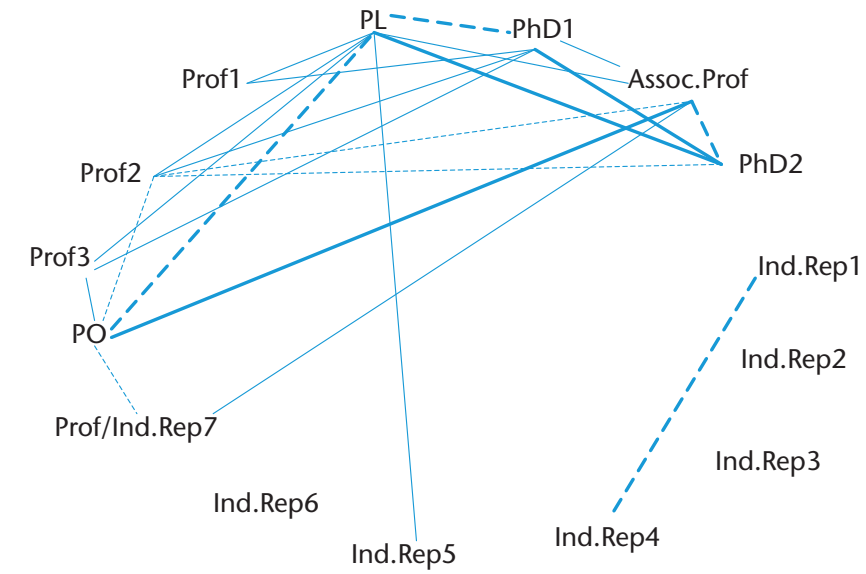


Figure 5.2b. *Network graph of project MechEng3 of contact outside of the project meetings at t = 0. Ind.Rep.5 en 6 belong to the same company; they did not answer the network measurement questions. The contact between Ind.Rep.4 and 1 (same umbrella company) was reciprocated and strong, yet from the interviews we learn that this contact was not (solely) related to this project.*

officer, and the industry representative impacted the interpersonal network structure. Though the already present industry representative was given the possibility to veto the decision to include the new company, he used that power to postpone the inclusion. The industry representative agreed with the new entry, which resulted in the structure of the project network to change: we see in the network graphs that between t = 0 and t = 1 a new actor was added to the network, and new ties appeared in the network – at the least between the researchers and the new industry representative. This is all relatively straightforward: someone proposes a new entry, people agree, the network is extended by that new entry. The practice of network negotiation here thus explains why we observed the addition of an actor in the structure of the interpersonal network of contacts in the project.

Inter-organizational ties Through the changes in the interpersonal network structure due to change of function of one of the actors (but maintenance of interpersonal ties between the three actors), the practice also had consequences for the inter-organizational ties. The negotiation resulted in the addition of a company at the inter-organizational network level that had not been included in that network yet, through a continuance of ties between the former student and his supervisors. The prior ties of the professor with the company to be included was a topic during the negotiation, though it is not clear why the program officer brought up this topic. The inclusion of the student-turned-industry gave way for a new company to enter the network and thereby strengthen the prior bonds between this company and the university researchers. We thus see how the interpersonal and the inter-organizational levels of networks interact through the practice of network negotiation.

Project progress and outcomes The inclusion resulting from the network negotiation impacted the project progress and provided room for potential new projects in the future. First, the inclusion of the student-turned-industry representative added an extra industrial voice in this project. In the project, industry was officially represented by multiple companies, but in practice industry was usually represented by just one company, of which the representative consistently showed up at the project meetings. Second, the potential for new projects was demonstrated in the fore-final meeting of the project, when it was discussed how to proceed with the project network, whether a new project would be set up, and what contribution the industrial representatives could make (especially, with regards to measurement facilities). In this discussion, it was talked about whether and how the newly included company's laboratory facilities could perhaps be made available in a potential follow-up research project. The inclusion of a new actor and organization through the practice of network negotiation thus seemed to have a positive influence on the project outcomes.

The follow-up project

The second instance of the practice of network negotiation is taken from project MechEng1. As this networking practice was conducted at the end of the project and with an eye on the future of the network project, it is not possible to visualize the project network continuity that resulted from the negotiation, as that continuity lies in the future. We can however describe this particular negotiation and analyze the ways in which it was enabled and constrained by and impacted the network of the people related to the project.

From the interviews we learned that the project network of MechEng1 in its present form had been stable as such for several projects and the senior people had known each other for many years already. Prior ties between the actors, and thereby the companies they represented, were thus reasonably strong, and were continued through the current project, MechEng1. In one of the later project meetings of that project, we witnessed a negotiation between university scientists and industrial representatives in which the inclusion of new companies in a follow up project was debated. The scientists wanted to discuss the first draft of a proposal for a follow-up project they were working on at that time. After the contents of the new project idea were discussed, the project leader said the researchers would like to proceed in the follow up project with the same group of industrial companies, and brought up the possible extension of that project network with two other companies. This sparked a long negotiation between the scientists and the industry representatives. The program officer of the funding agency functioned as rule-maker and process guard.

The researchers tried to gain consent for the inclusion of the new companies by bringing in arguments why the new entries could be useful for the project and the researchers. The industry representatives on their end argued why they felt it would not be a good idea to bring them in or set conditions. An argument of the scientists pro inclusion was that the group was getting smaller whereas the scientists needed a strong consortium of industrial partners for the continuity of research projects and the dissemination of results. Another argument was that the project proposal needed new elements to be granted approval by the funding agency, as already a number of projects on the same topic had been financed. The rule of the funding agency is that there always has to be a new element in project proposal, content wise (though original goals of current project had not been entirely met yet) and preferably also network wise (network needs new partners), which steered the networking of the scientists here. Additionally, the scientists brought in the argument that because of the generic and pre-competitive nature of their research – not "too close to market" – the inclusion of new companies in a follow-up project should be considered, as competition or IP would not be a problem. To protect their long-standing investments of time, money, knowledge

and material in prior and current projects, the industry representatives asked for possibilities to let the new companies pay a sort of 'entrance fee', which the scientists were against being afraid of a deadlock. What is interesting in this respect is that a remark by an industry representative for the scientists to just take completely different industry partners was brushed aside by the researchers. The project leader responded by saying, "never change a winning team", which indicates that the investment in the present ties was large and the risk of losing a strong and synergetic network unacceptable.

From studying the network contact contents between the project leader and the industry representatives at t = 1 and a follow-up interview with the project leader, we learn that after this meeting the project leader had been in touch with the industry representatives to ask for their decision on their participation in the new project, and on whether the new companies could join. The industry companies were willing to participate in the follow-up project, and were willing to make investments large enough to make the approval for the new project by the funding agency quite likely. However, they did not want the new companies to be included in the future project network. Even though they were given the opportunity by the project leader to set conditions for the possible entries – a compromise on her end to increase the chance for approval of the inclusion – they closed down the network, and according to the project leader, did not leave an "opening for discussion" about this point. Reason according to the project leader was that the new companies were competitors of two of the mainly involved industry partners, and so the exclusion for them was protection of their own interest, and consequently political. A third company did not bring in a cash contribution and thus had no real voting power, and for the fourth industry partner it mattered less as the new companies were no competitors. The project leader then stated – contrary to what was brought forward as an argument by professors in the meeting - that the subject was close to practical application, which rendered the present companies to be committed to and possibly profit from the project, and rendered it difficult for the inclusion of new companies to be accepted by them. As the industrial companies already brought in enough money with the existing group, the researchers could not "push too hard" for inclusion.

Interpersonal and inter-organizational network continuity We see here how the practice of network negotiation, in contrast with the first instance, contributes not to changes but to the stabilization of the network structure at both interpersonal and inter-organizational level. The project proposal by itself was important for contributing to the continuation of the network as it was: the funding agency officer said in the final survey that "the network will possibly be continued, as [the project leader] will in the short term submit a

new project proposal". The decision of the industry representatives to not allow the new entries closed down the network, and thereby further guaranteed the continuity of the existing network as it was. The long-term relations between the researchers and the industry representatives had been an asset as the ties were trusting and resilient, yet in this situation those relations constrained the researchers in building their network and projects for future purposes.

Project progress and outcomes The exclusion, or rather non-inclusion, of the companies did not impact the current project per se. The negotiation did provide one of the industry representatives the opportunity to show his discontent with the progress and outcomes of the current project, as he had also done in prior meetings. The negotiation did, however, change the researchers' proposal for the follow-up project and put them in the difficult position where they had to work with two different groups of companies with the same research interests.

We can derive from these analyses that network negotiation is a powerful practice that can contribute to two different network dynamics: a change (extension) of network structure in the project or the continuity of the existing network structure. Prior ties enable this practice as they provide the opportunity to include a new company (instance 1) but prior ties can also constrain the outcome of the practice, through the a-priori exclusion of new companies (instance 2). The analyses teach us that these courses depend on the power enactments by the different parties: people protect their resources already invested and close off the network or they prioritize the gaining of new resources for the project and open up the network. The rules of the funding agency framed the negotiations: for instance, the need to include a new aspect in the project proposal to increase chances for getting subsidies. The commercial rule of avoiding collaboration with competitors also influenced network negotiation. Moreover, the increasingly important rule for scientists to build relations with and gain money and other resources from industry to be able to conduct research is what started these negotiations in the first place.

Overall, analyzing the two instances of the practice of network negotiation gave us insight in how the strategic behavior of project participants either changed the network structure, or kept it stable. Linking the networking practice to the network structures also helped us to build an understanding of how the levels of interpersonal networking and inter-organizational networks interacted: through the continuity of interpersonal ties, inter-organizational ties were maintained as they were (instance 2), or through the continuity of interpersonal ties inter-organizational ties were built as the result of a change of actor characteristics, i.e. from student to industry representative (instance 1).

While the practice of network negotiation was primarily revolved around

the entrance of new companies in the projects, the next practice we discuss is revolved around the entry of a new individual in projects.

Network transfer

The second networking practice that we identified as accounting for network dynamics is network transfer. Some changes in the project network structures between t = 0 and t = 1 could be attributed to people leaving the projects for person-specific reasons†, e.g. retirement. This project abandonment had an impact on the network structures within the projects: the abandonment led to replacements of actors. This accounts for a personal change of a node: when a person replaces another person in the same function in the network - e.g. a change of project leader or industry representative, then that person needs to 'adopt' the already existing network connected to that position. We call this 'network transfer' as the network is transferred from one person to the other. As replacement and the required network adoption of the networks often went hand in hand, we take them together as one networking practice and call it network transfer. This networking practice contributes to changes at the interpersonal network level between t = 0 and t = 1 through a change or addition of actors in the project network, and to the continuity of inter-organizational ties. We will now discuss and analyse this practice on the basis of an instance of the change of a project leader in project MechEng2.

As the actual change of project leader happened before the data collection started, we are not able to capture this practice and subsequent changes in the project network structure in 'before and after' network graphs. Yet, from the interviews and observations we were able to reconstruct this networking practice, that is interesting as it demonstrates how the replacement of the most central actor in the project impacted on the development of the project network structure and the project progress.

In project MechEng2, the project proposal had been written for the large part by a professor, who was also the person through whom all industrial partners had been included in the project. Some because he had done earlier projects with them, some whom he had met during company visits, another because he had been a part-time employee at the same company. While writing the proposal, it was this professor who had asked the industrial partners to participate, which

† *This project abandonment does not imply that if people left the project, they also left the network, as connections may still have been in place between leavers and people who stayed in the projects. However, as that would have happened outside the realm of the project networks, this was not part of this study's data and it is therefore not possible for us to make statements about this continuity of network ties after people abandoned the projects.*

is demonstrated by the fact that all industry support letters in the application document were addressed to him. The companies included in the project network thus came out of his pool of prior ties. After the project had been approved and granted money by the funding agency but before the project had really started, this professor decided to leave the university. A new project leader had to be put in place. In consultation with the funding agency, the fellow project applicants then decided that an associate professor in the same research group would follow him up as project leader. As a member of the same group, she had ties with the same other researchers in the project network and she shared more or less the same knowledge resources and knowhow about the project, which made here eligible for the position. The transfer of the project to this new project leader meant she would also acquire and take over the care of the ties with industrial partners that the professor had established: network transfer.

Interpersonal structures The project leader already had prior ties with several of the industry representatives, yet as the project group was new in this composition, relationships with others had to be built from scratch, and the project leader had to work to build this group into a solid project network. In the graph of this project network in figure 5.3a *(page 171)*, we see how the project leader (PL) had few contacts with industry outside of the project meetings at t = 0.

This picture indicates how the project leader's contacts with industry outside of the project meetings were limited to one industry representative (9), who was a former PhD student in her research group. Her contact with the rest of the industry at that time was tied to the project meetings.

The network transfer to the new project leader impacted her network building with industry in the project. The project leader remarked that the newness of the group had affected the building of a coherent group as she had envisioned when taking over the project from the professor. In a follow-up interview towards the end of the data collection she said that is was "*tough to make that into a group*". This narratively points to the lack of overall density in the network, which we see in the network graph at t = 1.

In picture 5.3b, we see an increase in contact between the project participants outside of the project meetings. Yet, we also see a skewed density toward the researcher side of the network: the contact between the researchers about the project outside of the project meetings are reciprocated and have higher frequencies, whereas the relations with the industry representatives are scarcer, less reciprocated and less frequent. We see that the project leader personally had more contact with industry representatives, yet these were non-reciprocated (which means one of the two actors did not mention a contact to exist) and one-time affairs.

From this instance of network transfer we learn that the replacement of a central actor in the project network does not automatically mean that the ties related to that position are transferred smoothly to the new actor and do not automatically turn into strong ties. Prior ties may make it easier for the new actor to re-establish relations with actors in the existing project network (as shown in the picture of t = 0), but work is to be put into the (re)building of the ties if these ties are to be used effectively for the project.

Inter-organizational ties The difficulties in the continuation of interpersonal relations through the actor replacement and subsequent network transfer implies consequences for the inter-organizational ties. The project leader thought that the group had not built up to a strong group and she saw little commitment to the project. She stated that this was *"a pity, a missed opportunity"* as setting up a follow-up project with this same group of industry partners would become less attainable. We can derive from this that the project leader, the central actor in the projects (with often the highest in-degree count), had not been able to use her position to broker between parties and contribute to the building of ties. The network transfer had contributed to this suboptimal building and strengthening of ties between the partners, and had not accomplished a dense enough network to continue in the same form. Interestingly, from the survey we learn that the majority of participants did feel that a sense of community had been built because of the project, despite the fact that not much interaction between industry and university was seen by the industry representatives or the project leader. Apparently, the formal arrangement of being brought together in a project and meeting up through project meetings every six months already contributed to a sense of community.

Project progress and outcomes According to the project leader, for the success of the project it did not matter in her eyes. She did remark in the survey that, *"I am very satisfied about the research of the two PhD candidates, but I would have liked to see a stronger commitment of and collaboration with the users"*. We observe in the survey that the participants were not unanimously positive about the (provisional) outcomes of the project. Though most believed the objective was partially accomplished, two of the six industry representatives and one of the PhD students believed the objective was not accomplished. The overall trust in the achievement of their project goals was not high but sufficient, or even low (two industry representatives). We explain these outcomes as partly the result of the fact that the project leader had had to start with a network of which the ties were new to her and in which she had not been able to build trust yet, though we do not want to shut out other factors that contributed to this, such as changes made in the formal objective durig the project, the leave of a PhD student and long search for his replacement, the suboptimal coupling of the two PhD students (see

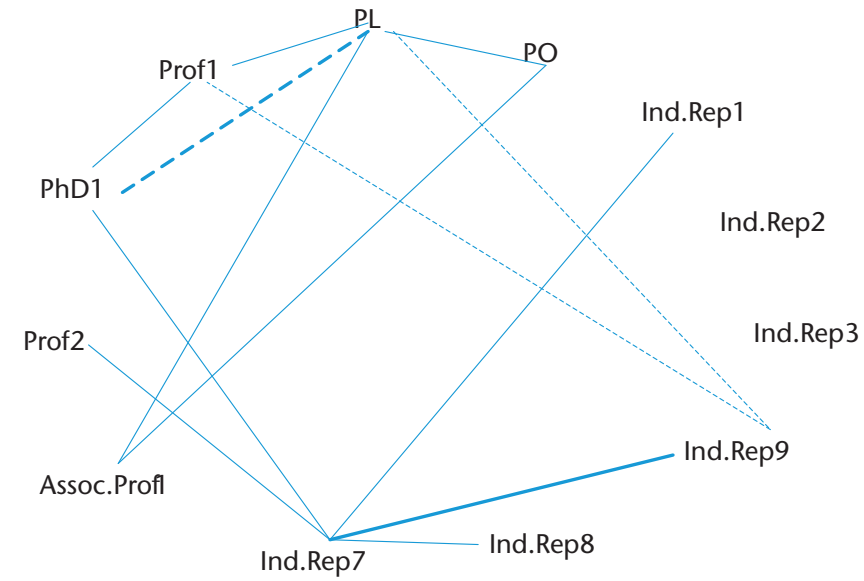


Figure 5.3a *Network graph of project MechEng2 at t = 0 (without project meeting contacts).*

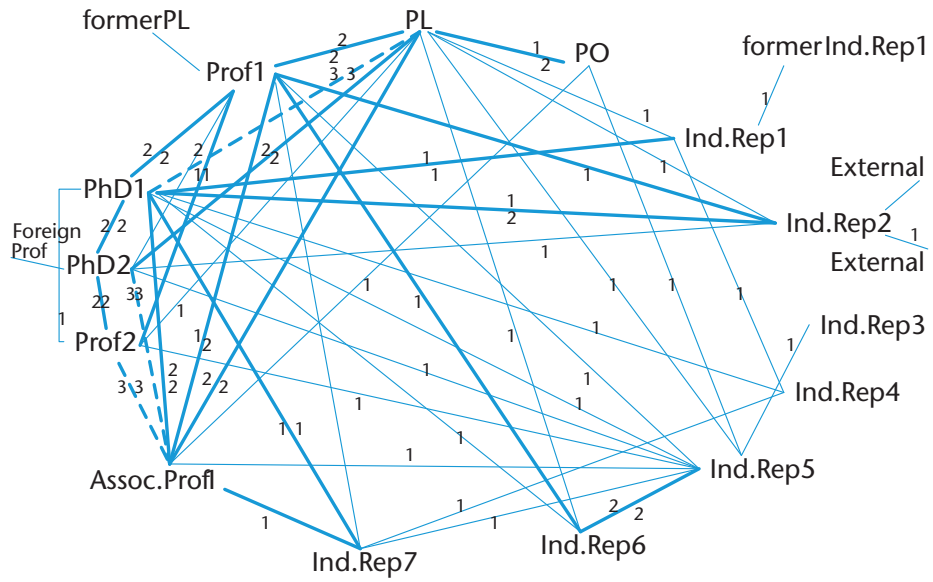


Figure 5.3b. *Network graph of project MechEng2 at t = 1.*

the section on tie hibernating), and the fact that the project was not finished yet.

Like network negotiation, the networking practice of network transfer helps us to understand the network dynamics on multiple levels: throughout the projects many permanent and temporary replacements such as the one discussed here were made, changing the composition of the interpersonal networks and at the same time guaranteeing the continuance of inter-organizational ties. Through a change of actors, the practice of network transfer can be valuable for the continuity of the inter-organizational ties, because the replacements on the interpersonal side contribute to the maintenance of the ties between universities, industry, and the funding agency. However, we learn that although on the inter-organizational level the stability of ties is guaranteed by network transfer, this requires work at the interpersonal level: as informal relations are person-tied, the new actor needs to (re)establish his or her ties (depending on his/her prior ties) within the existing project network. This may work out well or lead to loss of position and/or ties. If people are not replaced, or replaced but their successor is not able to pick up the network with other people that was already established by their predecessors, this may affect the value of the ties between the organizations and the outcomes of the project as a whole. For the replacement of a project leader, who is mainly responsible and the central and most powerful actor in the project, the transfer of the network is essential if the project is to achieve its goal of effective university-industry interaction.

We will now continue with the last networking practice: tie hibernating.

Tie hibernating

The practice of tie hibernating entails the (temporary) under- or non-utilization of existing network ties. We have called this 'tie hibernating' as a tie exists between actors, yet it is - in a particular period - latent, dormant, not activated. The practice of tie hibernating explains why between t = 0 and t = 1 we see the continuity of weak linkages (or, the lack of strengthening of ties) between researchers, and the lack of ties built between program officers and the majority of project participants during the projects. We will now discuss these two instances and analyze how tie hibernating contributed to structural continuities, inter-organizational ties, and the course of the projects.

Executive researchers

The first instance of tie hibernating comes from the side of the (executive) researchers.

Interpersonal structures In the network graphs of several projects we noticed that the contacts between researchers and their supervisors were more frequent than between the executive researchers of the different groups. The researchers'

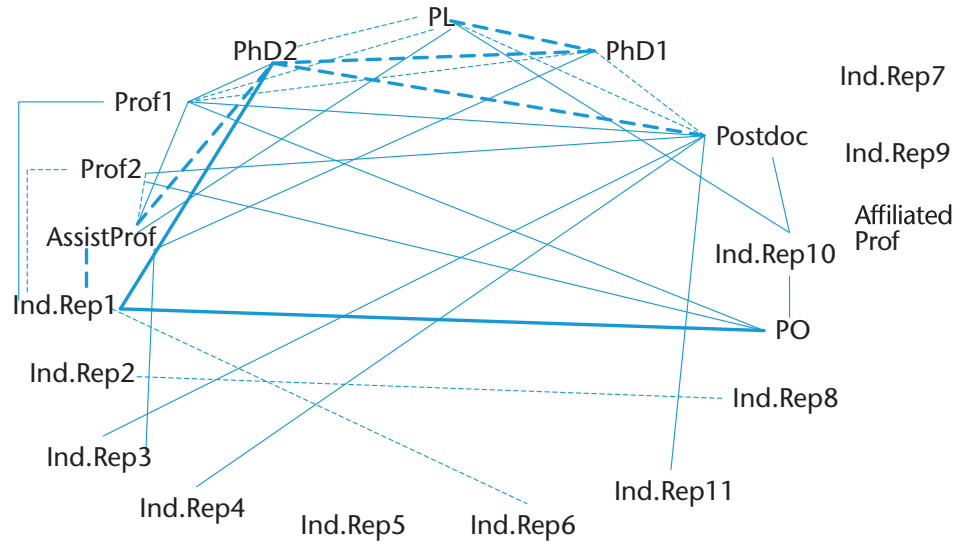


Figure 5.4a *Network graph of project CivEng1 at t = 0.*

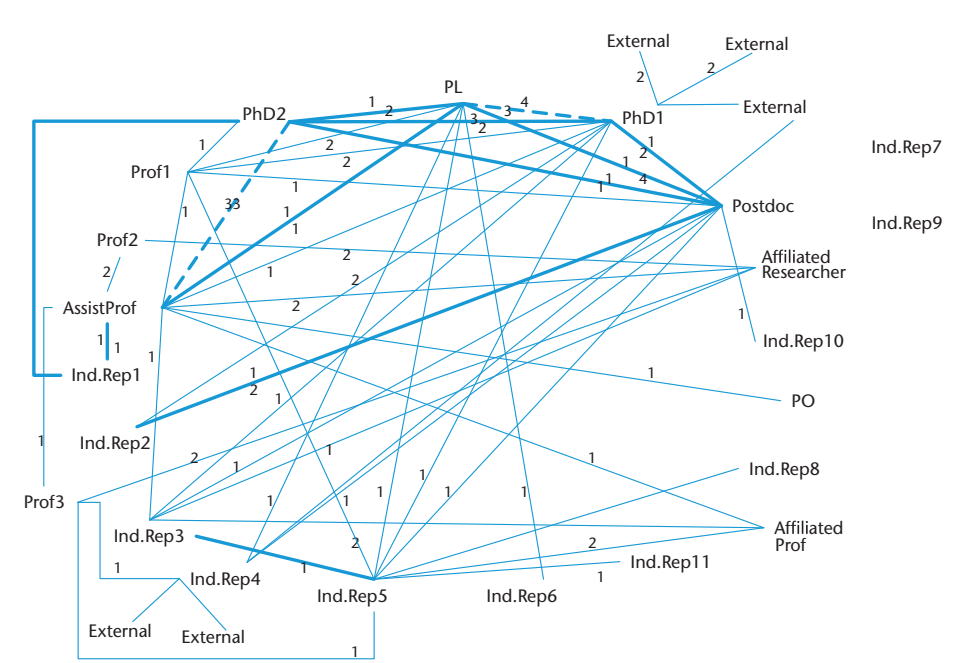


Figure 5.4b *Network graph of project CivEng1 at t = 1.*

networks were thus mainly organized by the proximity of colleagues and availability of close ties, their research groups. To a certain extent we see in the network graphs of t = 0 and t = 1 of several projects a continuous weak linking between executive researchers. See figure 5.4 (CivEng1) *(page 173)*, for instance.

The pictures of t = 1 show that contact outside of the project meetings was present between executive researchers (from different research groups) and that the frequency of those contacts were often monthly. However, compared to t = 0 where contacts between the executive researchers were regular, we see that in the particular case of CivEng1 the contacts decreased. The potential for building stronger relations based on the existing ties with other executive researchers at t = 0 was thus not exploited.

From the observations, interviews and the survey, we learn that it had indeed been a goal in each project to build strong ties between the executive researchers - the PhD candidates and postdoctoral fellows - to combine and thereby enhance the scientific and practical output of the different research subprojects. In practice, this did not happen as planned. The bonds between these researchers in at least three projects were not employed and used optimally. For instance, in the first half of project MediPro, the executive researchers – who came from different universities - were often in the same geographic location. Yet, they had been 'islands' for quite a while in the beginning of the project, as one of the PhDs stated, each defending their own goals and interests - which implies that geographic proximity is not a guarantee for strong ties. This was backed by the project leader who said to use her hierarchical position to try and bring them together and smoothen the bonds. Yet, not to a sufficient extent, according to one of the executive researchers as he reported in the survey. The differences in organizational cultures, languages and goals and the lack of a strong bridging party were said by multiple actors to have impeded the collaboration. The weak linking was one of the reasons why one of the executive researchers expressed his dissatisfaction in the survey with the project's progress and outcomes.

The tie hibernating between executive researchers in several projects is a result of the allocation of different sub projects to these researchers: each puts his or her own project interests above the general project interests, in order to write a dissertation. Because of this allocation and the nature of PhD projects, the building or strengthening of the ties between these researchers was not natural and self-evident: if linking had to be done, it would have to be stimulated. As apparent in the example of MediPro, here lies a task for the project leaders, who were responsible for the overall project progress. The tie hibernating between executive researchers was possible because project leaders did not employ their position of leader to strengthen this bridge, due to

inability or simple lack of acting as a broker between the executive researchers by the project leader.

Inter-organizational ties The practice of tie hibernating in this example may impact cross-university ties, as the potential building of stronger ties between researchers from different universities was not or was sub-optimally accomplished. In the case of MediPro, some answers to questions in the survey suggest that it may even have hurt the ties between the universities through the problems at the interpersonal level. In general, the weak cross-linking of scientists from different universities does not contribute to a stronger building of ties between those universities. Potential cross-fertilization of knowledge is thereby constrained.

Project progress and outcomes Tie hibernating among executive researchers had consequences for the outcomes of the projects. The practice led some participants to mention in the survey that the collaboration between the researchers could or should have been better. It was a factor that was mentioned in the survey as influential for the level of satisfaction of participants regarding the progress of the project. The benefits of knowledge accumulation and cross-fertilization, and eventually perhaps co-publishing, that might have been gained through strong ties between researchers were not completely achieved due to the practice of tie hibernating.

Between program officers and others

The second instance of tie hibernating is related to the funding agency's program officers.

Interpersonal structures From the network analyses based on the interviews in the beginning and the survey in the end, and complemented by our observations, we noticed how the program officers in most of the projects mainly had contact with the project leaders and fellow project leaders (usually associate or full professors), and for the large part did not have contact with industry representatives and executive researchers outside of the meetings. We see this in the network graphs of t = 0 and t = 1, which show that the program officers' networks within the projects heavily leaned towards the project leaders and professors involved in the projects and remained so during the projects. See for instance the figures of projects MechEng2 and MechEng3 presented earlier. We see that the most contacts of program officers outside of the project meetings remained with project leaders and fellow project leaders, and occasionally an industry representative or executive researcher. The potential ties between the program officers and other project participants existing at t = 0 were not developed further, hence hibernating. This was confirmed by both program officers and those other parties in the interviews, from whom it became clear that in between meetings the contacts between them were scarce. The ties between the program officers

and these actors were mainly maintained through encounters during project meetings. We thus see that the program officers were not central players in the projects, but mostly link up with scientists. This is in line with the finding in chapter 3 that the program officer had difficulty establishing a firm position with the project network. In project CivEng1 the transfer of ties to a different program officer (twice in a row) seemed to further reinforce this tie hibernating, as the last replacing program officer had only one interpersonal contact outside of the project meetings at t = 1, much less than the first program officer at t = 0.

Inter-organizational ties The program officers thus largely seemed to retain from linking up with industry and executive researchers and focused on building and using their relations with the central figures in the projects, the (fellow) project leaders. As a consequence of this focused tie building for the inter-organizational ties, the role of the funding agency in facilitating bridges and contributing to building inter-organizational ties between the industrial companies and the universities and of stimulating the interactions between researchers, was limited mostly to the project meetings. The facilitation of the projects as a funding agency made an important contribution to that tie building between science and industry (as we also saw in the previous chapters, and which the answers of the respondents to the survey also indicated), yet on the level of the program officers' tie building in the projects, this influence seemed limited.

Project progress and outcomes Tie hibernating had consequences for the impact the program officers could make on the course and outcomes of the projects. One consequence was that their knowledge of the networks and the actors therein was limited, including an understanding of their interests and goals for the project and their positions within their own companies – the latter mainly relating to the industry representatives. Time constraint was said by program officers to be an important factor that constrained their ability to build relations and get to know the project participants (particularly, the industry). Due to the hibernating of ties between program officers and industry and executive researchers, the officers' influence on the project progress and consequent success of the projects thus mainly had to come from their contacts with the central actors in the projects, the project leaders.

From the analyses of different instances of the practice of tie hibernating we learn that a lack of active network building can also contribute to network dynamics. Networking practices thus consist not only of active participation in tie and network building, but also the (possibly deliberate) refraining from network building, which has an impact on the structures of the project networks. Tie hibernating explains at interpersonal level the continuity of weak ties or the prevention of ties becoming stronger. Although formal arrangements may be in place at inter-organizational level, this is not a guarantee that ties are

actually built and/or optimally used at the interpersonal level. From this we derive that to let formal arrangements be effective and inter-organizational ties be effectively employed and used for the achievement of certain project goals - added value for practice, university-industry network building - the (stimulation of) active participation in relationship building by actors is required.

We will now conclude this chapter by discussing what theoretical contributions we can build from these empirical analyses.

Discussion and conclusion

It was our aim in this chapter to explore the recursive interplay between networking practices and network structures to build a better understanding of how network dynamics come about. Earlier dynamics studies mainly explored network structure changes and continuities through quantitative methods and at the macro level. We proposed an alternative approach to studying network dynamics, which is our first contribution: conceptualising network dynamics as a *"dual"* phenomenon, i.e. showing how networking practices change or stabilize interpersonal network structures and how network structures enable or constrain those networking practices. We did so in the particular context of university-industry collaboration projects. Combining qualitative data with social network analyses, we were able to build an understanding of how and why the networks of the university-industry collaboration projects were dynamic. This alternative approach has led us to make three more contributions, as it has shown us how network dynamics are *multi-level*; *political*; and *outcome driven and generating*. We will now discuss all four contributions.

Conceptualising network dynamics as a dual phenomenon

The first contribution the chapter makes is to provide an alternative conception of network dynamics as the result of the continuous interplay of network structure and networking practices. Studies of dynamics that conduct comparative analyses of network structures cannot capture this duality in-depth, i.e. do behaviors result from or do they precede network structures (Brass et al., 2004)? In this chapter we have contributed to knowledge on how activities, structures and (expected) outcomes influence each other, an issue that is of growing interest in network dynamics research (Brass, Galaskiewicz, Greve, & Wenpin, 2004; Phelps, Heidl, & Wadhwa, 2012). Combining the practice approach and analyses of network structures helped us explore the interplay between structures and networking practices that drive network dynamics.

The approach helped us observe networking practices that would not

have been visible with a mere structural analysis. The study showed us how networking practices that impact network dynamics can consist of purposeful action, but also (purposeful) inaction, as demonstrated by the practice of tie hibernating, or network negotiation leading to non-inclusion of new actors. Through the observations and interviews we came across one-time actions that changed and determined the course of the project networks and accounted for network structural changes and continuities we observed. The negotiation practice is a clear example of how a one-time event can determine the future of a project network structure: through the veto of a minority of network actors, the inclusion of new actors was blocked and the project network closed down. We demonstrated how a practice approach can provide this type of in-depth insight in how network change and continuity come about through networking practices, and that it is a valuable complement to structural analyses usually conducted for network dynamics studies.

Network dynamics as a multi-level phenomenon

The study taught us how the 'structure' side of network dynamics in the projects consisted of two levels: interpersonal structures and inter-organizational structures. Despite the insight that "firms only meet if individual employees of these firms meet" (Jolink & Dankbaar, 2010), this link between individuals on the micro-level and their organizations on the meso-level is not well researched and is in need to be developed further (Kilduff & Brass, 2010). This can provide inside in the cross-pressures between these levels and help to understand what drives networks to develop into a certain direction and certain outcomes. Our study's second contribution is to take a step into that direction by examining in-depth how interpersonal and inter-organizational ties cross-linked through interpersonal networking practices and thereby contributed to network dynamics.

Investigating network dynamics using a practice and structural approach helped us understand how in our research context of university-industry collaboration projects, changes and stabilities in interpersonal relationship building and inter-organizational ties interacted. These ties are connected as people represent and 'personify' their organizations. Both interpersonal and inter-organizational ties informed the interpersonal networking practices. What we saw in the analyses is that participants of the university-industry collaboration projects networked for a large part on the basis of prior ties, either interpersonal or inter-organizational, which they had already established. Then, the networking practices had an impact on those ties, by either changing them – e.g. formation of triads through negotiations, exclusion of actors from the project through negotiations – or by stabilizing them, e.g. guaranteeing tie continuity through network transfer. We showed how the need to continue

inter-organizational ties in the projects led to interpersonal tie building: for instance, when a project leader left, a new leader came in and had to work for network transfer. Here, continuity of inter-organizational ties thus came about through changes in interpersonal ties. Continuity of inter-organizational ties was also accomplished through the guaranteeing of or setting conditions for the continuity of interpersonal ties. We furthermore observed pressures the other way around: interpersonal tie building led to inter-organizational tie building, for which a good example is the student who turned industry representative. Here, continuity in interpersonal ties led to a change in the composition of the inter-organizational ties of the project network. In all these instances we see that changes or continuities at one level provided pressure for changes or continuities at the other level.

What we see is that the two levels of network structure are not necessarily in sync. Stability at the inter-organizational level does not (per se) imply stability at the interpersonal level, and vice versa. Also, change at the inter-organizational level does not automatically imply change at interpersonal level, and vice versa. The levels of interpersonal and inter-organizational ties are inextricably linked in a variety of ways, as the latter are based on the former, yet the latter also precede the former. This provides an understanding of the cross-pressures of these interpersonal network dynamics and inter-organizational network ties. The study furthermore taught us that stability, continuities, and no apparent changes in network structures are as much the result of networking practices as are network structural changes. The continuance of ties is also based in action. The practice approach helped us to make this visible.

Hence, if we are to understand in-depth how inter-organizational ties come about, are maintained, or changed (even dissolved), then it is valuable to examine the practices of networking by the people that represent and are responsible for those inter-organizational ties. The quality of inter-organizational ties is a derivative and the result of the quality of interpersonal networking and relationships. This analysis helps to build the notion that inter-organizational ties are basically the work of people, continuously impacting and worked on at the micro level, changing or remaining stable accordingly.

We illustrated how actions result from and precede network structures (Brass et al, 2004). From the analyses we learn how network dynamics come about through the recursive interplay between networking practices and structures of the project networks over time. The networking by the actors was enabled or constrained by prior interpersonal and inter-organizational structures and ties, as well as impacted those structures and ties. This continuous interplay is what constitutes network dynamics. We are thereby able to show empirically what Ahuja et al. (2012) argued conceptually, which is that structural changes at the

network level - i.e. the interpersonal and inter-organizational project network - and 'micro-dynamics' at tie and nodal ego network levels - i.e. of scientists and industrial representatives - co-evolve in a complex, interdependent fashion (Ahuja et al,. 2012). With a mere structural and quantitative approach we would not have been able to see the work that goes into the networks at the interpersonal level.

Network dynamics as a political phenomenon

Besides enhancing our understanding of network dynamics as a dual and multi-level phenomenon, the study taught us that network dynamics are also a political phenomenon, in line with the critical diversity perspective taken in this dissertation. This is the third contribution of our study. From our analyses of networking practices in this chapter we build further on chapter 3, and learn how network dynamics are driven by power. People enact power through their networking practices, and as such impact the stability or changes of their network structures. The practice of network negotiation, for instance, showed how the differing power dynamics in two 'performances' of the same practice can lead to opposite network dynamics: inclusion versus non-inclusion of new companies in the network. The analysis of the hibernating practice showed us that this practice was enabled by struggles over differing interests, as in the case of the executive researchers, and the non-interference of powerful actors, e.g. the project leader. Generally, we saw in the analyses that project participants were engaged in politics through their networking practices to keep people in networks (negotiations, transfer), to enable the use of ties for their own benefits and for the benefit of the projects (negotiations), to keep others away from the project or oneself, or keep oneself away from the project (hibernating, negotiations).

We showed that how networks are structured - how positions providing resources of power are distributed among actors – come about through but also precede the networking practices of people. Power in that sense therefore is present within both the networking practices and the network structures. As such, network dynamics are propelled by power. People engage in networking practices deploying certain rules and resources (derived from their social systems, chapter 3), among which the resources provided by their prior network ties, to gain the capacity to change (or keep stable) the project networks. Actors deploy resources with which they can influence both the interpersonal and/or the inter-organizational networks, and the course and outcomes of the projects. The consequence of those practices are the changes or continuities of the interpersonal and inter-organizational network structures. Showing this, we have taken the findings of chapter 3 a step further, zooming in on network structures.

Network dynamics as an outcome-driven and -generating phenomenon

The fourth and last contribution of our study to knowledge on network dynamics is concerned with how network dynamics and (project) outcomes relate. Research on consequences of network structures makes up the majority of network studies (Borgatti & Foster, 2003). However, questions of causality, i.e. how activities, structures, and outcomes are related, remain (Brass et al., 2004; Phelps et al., 2012). Using the practice approach to explore network dynamics has given us the possibility to explore the relationship between outcomes, networking practices and network structures. Studying the networking practices within the university-industry collaboration projects enabled us to examine not only how actors through their networking practices changed or stabilized network structures, but also how that impacted their projects' progress and outcomes.

We observed in the analyses how the networking practices impacted the network structures over time, and simultaneously steered the direction in which the projects went, influencing the eventual project outcomes. *Network negotiation* can lead to inclusion of new actors, which provides new knowledge, money, or materials to be brought in. We saw this occur, for instance, when the student-turned-industry-representative suggested the potential use of his company's facilities in a follow-up project. Negotiation, as we observed, can also lead to the exclusion of actors, which prevents those resources from being brought in. This can be a negative result, yet it can also prevent tensions and politics resulting from the inclusion of competitors. *Network transfer*, if successful, repairs the time delay, loss of content knowledge, and loss of network knowledge that can come from people leaving the project, or it can lead to difficulties in building strong ties and lead to suboptimal results. We saw the latter with the change of project leader. Transfer of networks could potentially also lead to positive results, through increasing input in the project or through the building of stronger ties. *Tie hibernating* provides benefits for actors who aim to protect their own resources and do not intend to use their ties with others, yet it can have detrimental effects for the projects as a whole, as relations and available resources like knowledge, materials or even money are underutilized or relations are not optimally employed. For instance, the less than optimal linking up between executive researchers led to suboptimal results of the projects according to participants - though the separate sub research projects were satisfactory according to researchers and others. As such, it contributes to the achievement of the goals of university-industry collaboration.

From this we learn that each networking practice had a different impact on the projects' progress and outcomes. Accumulating these findings, we observe that the quality of interpersonal ties, the relations between different actors, and

changes therein can affect the quality of the inter-organizational networks, both positively (e.g. improved university-industry collaboration) and negatively (e.g. potential loss of knowledge). Additionally, studying network dynamics provides insight in the changes in the distribution of benefits and constraints for individual actors from their networks (Ahuja et al., 2012). The shape of the university-industry project network structures (roughly, the greatest density existed on the side of the researchers) indicated who benefitted the most from the network and how the outcomes of projects were established: in most cases the scientific outcomes prevailed, whereas the practical added value was often limited and differed for the different industry representatives. We observed how the networking practices or a combination of networking practices led to differences in participation, and how some actors benefitted more from the projects than others. Tie hibernating, for instance, helped some industry partners to gain tangible advantages from interacting with the scientists in the projects, whereas others did hardly or not at all due to their networking practices. Studying network dynamics by combining a practice and structural lens thus provided insight in why and how changes in distributions of benefits occurred, and the enablers and constraints individual actors encountered in participating in network building.

From these analyses concerning the project outcomes we learn that network dynamics, at least for some part, are *outcome driven*, in the sense that the networking practices are driven by the goals and benefits pursued by the different actors. The outcome of the project networks as a whole, e.g. the development of science's value for society, and the benefits sought by the actors steered the networking practices. We confirm Phelps et al. (2012)'s claim that network structures are not exogenous to network outcomes, i.e. that network structure precedes network outcomes. Rather, by digging deeper into the dynamics of networks through a practice study, we were able to better understand how outcomes not only follow structure or position, but also direct networking practices. This has consequences for the network structures. However, we should be careful not to overemphasize the rationality of actors for engaging in networking practices: as previous chapters showed, some networking practices are unreflectively engaged in and their consequences unintended and unforeseen.

Additionally, we gained an understanding of how those practices had a direct consequence for the projects: including some actors, excluding others, marginalizing actors, strengthening ties or letting ties hibernate steered the direction of the project's outcomes and changed the distribution of benefits for the project participants. We thus learn that network dynamics are *outcome generating* as the networking practices drive certain project courses

and outcomes to be produced. Following this, we conclude that outcomes are not separate from, or functions of, networks. Outcomes do not follow from network structures, but inform and are actively shaped and pursued through networking practices.

Conclusion

The question at the basis of this chapter was, how, in the case of university-industry collaborations, networking practices change or stabilize interpersonal network structures and how those network structures enable or constrain those networking practices. Based on the presentation and discussion of our practice-based empirical study we can now answer this question. The combination of prior interpersonal ties or inter-organizational ties and the desired outcomes of particular actors and the projects as a whole inform networking practices at the interpersonal level in the form of (socio-political) networking practices. These networking practices then work to either reproduce the ties at interpersonal and/or inter-organizational level, or change either or both of them. Network dynamics are driven by this continuous multi-level relation between network structures and networking practices.

Our study of network dynamics in the university-industry projects has demonstrated that it is a valuable approach to provide insight in network dynamics that a mere structural network study, especially at the inter-organizational level, would have difficulties to capture. The fine-grained analysis of the three networking practices has provided us with a peek into the network processes at the micro-level of (inter)organizational networks, showing how the practices that are enabled and constrained by structures propel or constrain network structure change and stability. We built an in-depth understanding of the development of interpersonal networks and thereby of (inter-) organizational ties in the case of the university-industry collaboration projects. It has given us an entry into studying the practices of actors in their networks in relation to the structures of those networks, enabled us to relate multiple levels of networks with each other, to see the political dimension of network dynamics, and to gain in-depth insight in the relation between network dynamics and outcomes of networks.

General conclusions

> *Many believe effective networking is done face-to-face, building a rapport with someone by looking them in the eye, leading to a solid connection and foundational trust.*
>
> Raymond Arroyo

This dissertation had the objective to further develop the notion of networking as a practice. I advanced this notion by combining a practice-based approach and a critical diversity perspective in my study of networking practices. Networking and diversity are important and timely topics of research, as they are of high societal value in our increasingly networked and diverse organizational world. Scholars have argued, for instance, that both networks (Valk & Gijsbers, 2010; Berkhout, et al., 2010; Dhanaraj & Parkhe, 2006; Lam, 2005; Swan, Bresnen, Newell & Robertson, 2007) and diversity (Cox & Blake, 1991; Van Knippenberg, De Dreu & Homan, 2004; Williams & O'Reilly, 1998) can be fruitful for the development of innovation. In my dissertation I have explored these two phenomena together in the study of university-industry collaboration projects – the epitome of networked innovation development on the premise (or promise) of diversity.

Throughout the different chapters, the combination of a practice approach and critical diversity perspective to explore networking has allowed me to build insight in how (inter)organizational – more specifically, university-industry - networks are built, developed, and used. Table 6.1 shows an overview of the various networking practices analyzed in the different chapters. The practices differ regarding which actors were (predominantly) involved in the networking (e.g. scientists or funding agency officers), the phase of the project network in which the networking was performed (e.g. before the start or in the middle of a project), and the focus of the networking, i.e. whole group or dyadic. I see for instance how the exclusion of partners in a potential future project was done both through networking in which all network participants were involved at the end of a project (network negotiation, chapter 5) or through networking between only a subsection of participants of the project network just after the start of a project (starting up, chapter 3). The practice approach enabled building such in-depth insight in the different ways in which networks are built and developed.

Combining the practice approach with the critical diversity perspective has provided a better understanding of how networking practices contribute to a diverse set of outcomes, such as inequalities based on functional diversity or gender, and collaboration project progress and performance. Moreover, the study allowed me to explore the complexities of power and inequalities in relation to diversity in networks, by critically examining the relationship building between people from different functional backgrounds and genders.

Instrumental accounts of diversity emphasize the consequences or effects of diversity in the sense that diversity, if managed well, leads to innovation and other profitable outcomes. By using a critical diversity perspective, I went a step further and demonstrated how diversity breeds power processes, which contribute to inequalities of input and outcomes. Networking practices were shown to have an important role in how the diversity of actors in networks, in particular in the university-industry networks, plays out.

In this chapter I wrap up the dissertation. First I build the outline of a critically-oriented practice-based theory of networking, based on the studies in the four chapters. In so doing, I elaborate on the theoretical contributions of the dissertation. I then reflect on the research and discuss limitations of the research and directions for future research. Next, I provide several practical considerations and recommendations, and end the dissertation with concluding remarks.

Table 6.1 Overview of studied networking practices

Chapter 2 Networking as practice	Chapter 3 Networking & Power	Chapter 4 Networking & Gender	Chapter 5 Network dynamics
· Whole group socializing: coffee breaks	· Starting up: in- and excluding partners	· Organizing a university-industry network event	· Network negotiation
· Framing the networking	· Engaging industry	· Socializing: coffee breaks, lunches	· Network transfer
· Setting up projects with industry; meeting with industry; building bridges through translating	· Refitting relationships	· Project organizing	· Tie hibernating
· Steering towards applicability; lobbying	· Facilitating the project network	· Composing the network	
		· Presenting results to others	
		· Giving/getting a company tour	

A critically-oriented, practice-based theory of networking

In this section I further develop the notion of networking as a practice by discussing a number of theoretical lessons drawn from the overall research, which I explicate by referring to the studies in the different chapters. The theory is built step by step, starting with the fundamental building block of the theory: agency of people regarding their networks (lesson 1). This agency cannot be well-understood without taking into account the structures that enable and constrain the agency of people (lesson 2). The duality of structure and agency which makes up networking practices and thus organizational networks is discussed in this lesson. The next lesson, then, holds that network dynamics are the result of the duality of networking practices and network structures, as networking practices are informed by and steer network structures (lesson 3). The fourth lesson adds another layer to the theory by arguing how networking practices are inextricably intertwined with power processes and inequalities (lesson 4). This is divided into a lesson regarding functional diversity and a lesson regarding gender in relation to networking practices. Together these lessons form the outline of a critically-oriented, practice-based theory of networking.

Agency...

One of the premises on which this dissertation is built, is the widely recognized fact that knowledge on what actors actually do regarding their networks, i.e. agency in networks, is underdeveloped (Ahuja, Soda & Zaheer, 2012; Ibarra, Kilduff, & Tsai 2005; Kilduff & Brass, 2010; Kilduff & Tsai, 2003; Manning, 2010). Consequently, knowledge of what people actually do when they build and maintain their networks was underdeveloped (Benschop, 2009). Approaching networking as a social practice required me to explore the doings and sayings of people when they build and make use of their relationships in real time and space. More than Benschop (2009) and Van den Brink and Benschop (2014) were able to do via their interview studies, the case studies allowed me to build an account of the actual work that goes into networking, that is, real-life agency in networks. From this I learned that networking is constituted by the - often seemingly trivial - activities conducted by people to build, maintain, or even quit their relationships, such as giving a tour around one's company site (chapter 2), making phone calls to keep up visibility and get necessary input (chapter 3), socializing over coffee and tea (chapter 4), and negotiating about the potential inclusion of new people and organizations in the project network (chapter 5). This provided me with the first theoretical lesson:

(Inter)organizational networking is constituted by the people representing an organization and the agency they perform regarding their network ties. Networks are not the result of one or two forms of ties (e.g. friendship and advice), but are the result of many different, simultaneous, small-scale and often seemingly trivial actions of people on the interpersonal and inter-organizational networks in which they are embedded. As agency forms the building block of organizational networks, it is therefore relevant to study what these actions are, where they come from, and what their consequences are.

The fine-grained analyses of observations, interviews and documents allowed me to explore the micro-level network interactions of the participants in the university-industry projects. The different chapters gave insight in the actions that project participants performed to work on their relationships. These were either routine actions enacted in each project, or actions performed in multiple meetings and/or performed in multiple projects, which I called networking practices. A practice approach to networking transforms abstract nodes into people with identities, and one-dimensional ties into intricate interpersonal relationships. The different chapters indicate that networks are not so much entities that people *have*, but that they *do*, i.e. accomplish through their actions. The approach also taught us that these practices are never exactly the same due to the contingent nature of social practices – a practice is always enacted in a certain time and space and by certain actors with their own idiosyncratic identities, which makes its performance dependent on the situation and practitioners enacting the practice. Through studying the networking practices, I showed how networks are – in Mary Parker Follett's words - not so much a noun, but a verb: networks are the sum of people together 'working the net'. I thereby contributed to knowledge on, first, how to study agency in organizational networks, and second, provided insight in what that agency entails.

Structure...

The research showed that the agency of people regarding their networks cannot be understood fully without taking structures into account. The dissertation was inspired by Giddens' theory of structuration (1979, 1984), which poses that social systems are reproduced through the continuous recursive interplay - the duality - of structure and agency. Whilst Giddens' notion of structure is abstract, in this dissertation I conceptualized and studied structures in relation to networking practices in two ways: sociological structures and network structures. Using the practice approach and a critical diversity perspective in the context of university-industry collaborations, it was shown how there are multiple 'structures' which inform, and are reproduced or challenged by,

how people build relationships with each other. These structures are not only network structures (chapter 5), but also structures in a sociological sense: practice-nets (and related identities) (chapter 2), which form part of larger social systems (chapter 3), and the gender order (chapter 4).

The analyses of the different chapters showed that by engaging in networking practices that are informed by these different structures, those same structures were for the large part reproduced. Socializing by shaking hands or having coffee and tea, people enacted and thereby reproduced these (often taken for granted) cultural practices of connecting (chapter 2). Some jokes made or questions posed during coffee breaks were shown to reproduce gender practices (chapter 4). And though scientists and industry representatives tried to change the resource distribution of their social system by building relationships with parties from the other social system, they networked largely within the framework of rules without challenging those rules - though as the opening quotes of chapter 3 showed, sometimes challenging the rules of the other party. Structures were also sometimes challenged by those practices. For instance, by lobbying for more resources in their organizations, industry representatives aimed to change their organizational practices in order to create more space to bring input to the projects (chapter 2).
All in all, these findings provide the next theoretical lesson:

The micro-level actions of people regarding their networks cannot be understood fully without taking structures into account. Networking practices are structurally embedded as they are informed by, and at the same time inform different sociological structures. Accordingly, engaging in networking practices means for the large part reproducing, but also challenging those structures. This continuous interplay is the structure-agency duality of networking and networks.

Taking the different structures into account, I built a better understanding of the recursive interplay between structure and agency of networks. This duality of structure and agency makes up networking practices and thus organizational networks. Next, I took the notion of networking practices a step further and employed it to build a better understanding of network dynamics.

Dynamics...

The study of the agency of people regarding their networks and the duality of structures and the agency of people implies that networks are socially accomplished and continuously reproduced or changed, and therefore dynamic. This was most concrete in chapter 5, in which I positioned myself in the – for the large part structure-oriented - debate on network dynamics. I used the notion

of networking as practice to further develop insights on network dynamics. To show how network dynamics come about, I explored the interplay between networking practices and network structures. From this I derive the next lesson:

> *Besides the previously discussed sociological structures, the micro-level actions of people in and on their networks can also not be understood fully without taking network structures into account. Networking practices are informed by and at the same time inform network structures. As such, they drive network change or reproduction, and thus stability, and thereby network dynamics.*

Chapter 5 specifically focused on structures in the sense of network structures. I analysed how the initial or prior relationships and networks of participants informed networking practices observed in the several projects. The chapter also gained insight in how subsequently, the networking practices either kept stable and reproduced, or changed the network structures and individual relationships. Network negotiation, for instance, was shown to lead to either inclusion or exclusion of actors (and hence organizations), and thereby to (organizational) network change and stability respectively. We learned and demonstrated that actors build and develop relationships from the position they are currently in within a network structure. This is the enabling and simultaneously constraining nature of networks. As people engage in networking practices, they then either change their ties and positions in a network, or keep them stable, thereby either changing or reproducing their networks. Networking practices are thus embedded in chains of action and reaction: one networking practice triggers the next, rendering networks to be continuous processes instead of static entities.

The lesson is visualized in the figure that was the basis of chapter 5:

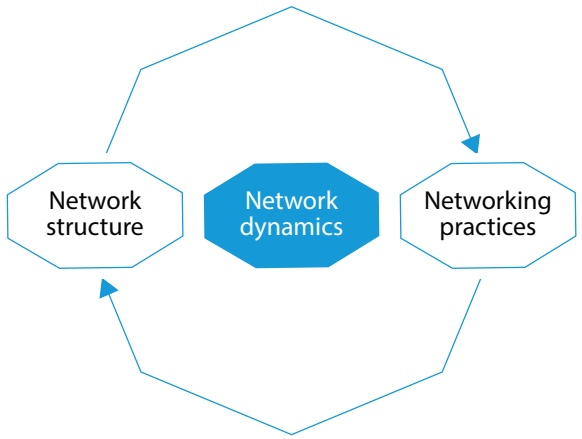


Figure 6.1: *Basic notion of network dynamics: interplay of network structure and networking practices*

These first three lessons brought us more insight in how networks are social accomplishments (Benschop, 2009) and how network dynamics come about (Ahuja et al., 2012). The critically-oriented, practice-based theory of networking does not end here, however. The studies also pointed at the relevance of power for the networking practices and network dynamics. This is discussed in the next lesson.

...and diversity, power, and inequalities

In the different chapters the critical diversity perspective led us to learn how:

> *Networking practices are inherently intertwined with processes of power and inequalities and are, hence, socio-political. The chapters showed how differences and inequalities present within structures shaped the networking practices of project participants. It was also shown how, vice versa, networking practices reproduced or countered those structural differences and inequalities. These differences, inequalities, and power processes relate to both functional diversity and gender.*

Chapters 2, 3, and 5 were concerned with the *functional diversity* in the collaboration projects: starting point in these chapters were the functional backgrounds of the participants – the scientists, industry representatives, and funding agency officers. We saw in chapter 2 how the practices as established by the funding agency brought about inequality in the projects in the sense that the scientists were dominant in steering the project course and building the project networks. Hierarchy within their organizations restricted the input industry representatives could bring in the project, and the (consequent) lobbying practice of the industry representatives can be seen as a socio-political practice to change that structure. This chapter provided initial insight in the power processes that lead to and are brought about by networking practices in a situation of a diversity of actors.

Chapter 3 was dedicated to elaborating our insights on the power dimension of networking practices. I argued and demonstrated how the rules and resource distributions of the different social systems of the project participants rendered the networking practices of the participants socio-political. Keeping up visibility, for instance, was performed by PhD students and senior scientists with the purpose to keep the project on the radar of industry representatives - who did not prioritize the project because of their commercial focus - and as such to gain influence on the input provided by those representatives. Participants engaged in networking practices to get things done from others on whom they were dependent. Networks and power are thus related not only from a resource or positional point of view, as network studies often conceptualize power, but also from a practice point of view:

engaging in networking practices is engaging in politics.

Chapter 5 focused on the exploration of how networking practices related to network dynamics. Central was not how power and networking practices related, but how power-laden networking practices informed network dynamics through driving structural changes or stabilities. The chapter showed how, as a result, organizational network dynamics are an inherently power-laden phenomenon. Network negotiation, for instance, was driven by the (potentially opposing) interests of project participants regarding inclusion of new actors, and resulted in changing or stabilizing the interpersonal and inter-organizational networks. From these chapters we learn that

> *Informed by social systems, prior network structures, and differing interests, networking practices between people with different functional backgrounds are power-laden practices. People engage in networking practices to gain certain benefits for which they are dependent on others, which renders those practices to be socio-political. As such, networking practices work to serve certain interests and either reproduce or challenge function-related inequalities in networks.*

The research provided insight in how diverse people built relationships within a situation of mutual autonomy and dependence; how different backgrounds provided opportunities but also difficulties for actors in their collaborations; and how actors resorted to practices of relationship building to overcome those difficulties and achieve the goal of joint innovation development.

Where the former was related to functional diversity, chapter 4 focussed on diversity and inequalities related to *gender*. The critical diversity perspective to networking practices helped me to complement structural studies on gender inequalities in networks (e.g. Brass, 1985; Ibarra, 1992) by showing not the outcomes of, but the actual act of gendered networking. This contributes to the gender literature as it identified the practicing of gender in networking practices in relation to available gender practices. Building on Martin's (2001, 2003, 2006) distinction between gender practices and gender practicing, I was able to unravel how gender practices were reproduced or stretched and challenged by the spatial-temporal practicing of gender. This type of research is relevant as such studies take away gender's invisibility and legitimacy by showing its subtleties in everyday practices.

In chapter 4 we demonstrated that informal and formal moments of networking provided a platform for gender practicing, which means that people sometimes practiced gender when they were working on their interpersonal relationships. Stories of women who were involved in the university-industry projects demonstrated for instance how informal networking was informed by

culturally available gender practices, to their disadvantage, confusion, or dislike. Observational instances and interviews also showed how actors – both women and men - worked on their relationships in such a way that gender stereotypes were challenged, such as a woman PhD student who appeared to be one of the dominant attendees at a project meeting predominantly attended by men.
From this chapter I derive the following theoretical lesson:

> *Networking practices are platforms for (potential) practicing of gender. Networking practices are thus intertwined with gender practices. This means that people sometimes draw from gender practices when they are working on their interpersonal relationships. In so doing, they reproduce gender inequalities in networks, but also sometimes challenge them through their networking practices. Humour and non-reflexivity play an important part in the gender practicing through networking practices.*

All in all, these lessons on diversity, power, and inequalities show how power and inequalities are inherently intertwined with networking practices. The lessons were based on the combination of a practice approach and a critical diversity perspective on networking practices. I did so to examine the less visible side of the relationship building between diverse actors in networks. Whereas Benschop (2009) and Van den Brink and Benschop (2014) focused on gender, I built a critical perspective on both gender and functional diversity. This allowed me to gain a better understanding of different power processes that occur simultaneously within networks. It taught me that small-scale and seemingly trivial networking actions can be both beneficial and disadvantageous for different actors, and can lead to and are led by higher-order outcomes (e.g. network structures). The perspective moreover enabled me in the different chapters to identify different ways in which actors are in- or excluded in networks and in which some actors are marginalized and others centralized – related to both functional diversity and gender – through networking practices. These practices contributed to inequalities of input for and benefits from the projects. Studying the power processes provided a better understanding of how people's networking practices enable or limit the gaining of benefits and how networking practices shape project benefits and outcomes. I conclude that diversity in networks goes hand in hand with politics, as people build relationships with each other to gain or keep benefits for themselves and/or the overall network, and thereby (re)produce or challenge differences and inequalities in networks.

I recapitulate the critically-oriented, practice-based theory of networking as follows:

Recapitulation

All things considered, the critically-oriented, practice-based theory of networking I have built, holds that organizational networks are constituted by network actors and their agency regarding their interpersonal relationships. These actions are not only embedded in network structures, but also in structures of social systems, cultural, organizational, and professional practices, and the gender order. Networking practices are done in someone's interest and within an arena of mutual dependence and autonomy. This renders networking practices to be socio-political, and to reproduce or challenge inequalities. Networking practices are the vehicles through which the duality of agency and structure of organizational networks plays out and which render networks to be dynamic.

Reflection on research

Interpretive research needs to be carefully designed and conducted to be rigorous and trustworthy (Yanow, 2006). In this section I reflect on the design and execution of my research and discuss the limitations which condition the scope of the findings. Related to this, I elaborate on possibilities for further research. Topics I discuss are the research design; research context; collection of the empirical material; analysis of the empirical material; and the conceptualization of diversity.

Research design

Case studies provide for 'thick descriptions', which is an important quality criterion for interpretive research (Schwartz-Shea, 2006). However, a risk of case study research is that it results in idiosyncratic theory that does not go beyond explaining the observations in a particular context (Eisenhardt, 1989). I tried to prevent this by having a pre-set overall goal: to further develop networking as a practice. This goal framed all data collection and analyses. The aim of the study was not to provide a comprehensive explanation for the outcomes of university-industry collaboration projects per se, but to highlight and better understand the processes of diverse people building relationships with one another in the context of organizations. As such, the cases were used as a fundament for building a better understanding of what the notion of networking practices is and what the study of the notion may teach us. The research allowed me to gain more insight in what happens at the micro- and meso level of university-industry collaboration.

Richness is a strength of case study research, which I was able to use to illustrate the complexities and intricacies of interpersonal networking and the embeddedness of networking practices in the larger contexts in which people move. Yet, the richness of empirical material in case studies also brings along the risk that developed theory is overly complex (Eisenhardt, 1989). Indeed, data richness can put the researcher at risk of 'data asphyxiation' (Pettigrew, 1995). Again, having networking as a practice as the guiding concept for the analyses in the different studies helped to focus the collection and analysis. The goals of the different chapters were further guiding principles. Though the framework of the different chapters had been established beforehand, the actual research questions and subsequent papers were the result of an iteration between ongoing literature study and the data collection and analysis. Power, for instance, had not been part of the original research plans, but appeared as an intriguing and relevant aspect of the networking practices of project participants.

Research context

University-industry projects

I studied networking practices in one specific context - university-industry collaboration projects - which provided an intriguing case to study networking from a combined practice and critical diversity perspective. The projects were part of three different technological fields: civil engineering, life science, and mechanical engineering. I for the large part focused on similarities in networking practices between these sectors. Future research could compare collaboration projects from different fields to further improve our insight in networking practices in the specific context of university-industry collaborations. As fields have idiosyncratic ways in which university-industry collaborations are given shape, studying the actions on the micro-level and the embeddedness of those actions in structures could provide further insight in the processes and outcomes of collaborations in those particular fields and of university-industry collaboration in general. To further develop knowledge on how people's networking practices impact their networks and outcomes, future research may also explore other organizational contexts, such as business to business networking, inter-departmental networking, inter-disciplinary (scientific) networking, or entrepreneurial networking. Additionally, the projects I studied were facilitated by a Dutch government-based funding agency. Future research could take up a comparative perspective between collaboration projects facilitated by different agencies, to further the understanding of the role of funding agencies as intermediaries in university-industry networks and how they impact on how scientists and industry partners build relationships and project outcomes.

Gender ratio

I selected the cases on the basis of the presence of at least one woman as studying the role of gender was part of the research goal. Apart from the medical technology project, the projects were similar in their gender imbalance (one or two women, the rest men). Some of the projects under study became all-men as the involved woman was not present at meetings or withdrew from the project. Future studies on gender and networking practices could try and select networks and fields with more differing ratios of men and women: female-dominated, male dominated, or balanced, to see how networking practices intertwine with similar or different gender practices and which 'forms' of gender practicing prevail in different (gendered) contexts. As such, knowledge on the intertwinement of gender and networking practices and gender inequalities in networks can be advanced further.

Collection of empirical material

As for all research, an important aspect of good interpretive research lies in its methodology. I aimed to be as transparent as possible about the research process, another criterion of quality (Schwartz-Shea, 2006). I did so, first, by upfront determining the research approach and getting feedback on the research I was planning to conduct through the research committee of my research institute and the funding agency as sponsor. Second, in the introductory chapter and for each individual chapter I elaborated on the methodological steps I took to come to the findings of the respective studies. Third, I included excerpts of moments in which networking was done and other relevant empirical materials in the findings sections of the chapters, so other scholars and readers can compare their interpretations to mine.

To come to a well-grounded account of what happened in the cases, I used triangulation of data sources. This helped to understand the situations from different vantage points and worked to prevent idiosyncratic interpretation (Yanow, 2006). The triangulation of data collection through observations and interviews enabled cross-checking the empirical material and gaining a more comprehensive picture of what went on in the project networks. Also, asking supplementary questions, repeating and paraphrasing, and asking for examples or explanations during interviews and observations helped to collect people's experiences as much as possible. Doing the research longitudinally helped to become more familiar with the projects and the participants, and to make comparisons of the networking in the cases over time.

However, there are also some limitations methodologically, related to the observations, network measurements, and outcomes.

Observations

The observational material was collected through project meetings and a number of other events outside of the projects' meetings. As these meetings were centrally arranged and one of the few opportunities for the scientists and all industry partners to come together, these provided a good entry into the networking practices between the different parties. Due to confidentiality issues, the meetings were not recorded digitally but through detailed field notes. I did not do observations outside of these meetings, however. To capture the networking practices outside of the project meetings, I conducted interviews at the beginning of the data collection, spoke with people during the observations, studied documents, and ended the data collection with a survey. Future research could be designed in such a way that observational data are also collected systematically outside of the project meetings: to be present at visits at the companies or universities in-between project meetings, or to shadow scientists and industry representatives to understand how and to what extent they deal with and network within the projects in their everyday activities and interactions. This would add to our knowledge on the practice of university-industry networking apart from the formally arranged spaces of networking.

Network measurements

Additionally, I measured and analyzed the network structures at t = 0 and t = 1, as discussed in chapter 5. To allow for more robust comparisons and conclusions on changes and stabilities in interpersonal network structures over time, future research should do the same socio- and ego-metric measurements of the interpersonal structures at both measuring points, with all network actors at both times. Also, the structural analyses could go more in-depth to study the more complex intricacies of the interpersonal network structures. Future research could focus on specific characteristics of network dynamics such as centralization of actors or the formation of subgroups with the critically oriented practice-based approach to better understand how those network dynamics come about and with what consequences for the involved actors (e.g. benefits or inequalities) and networks as a whole.

Outcomes

Furthermore, the outcomes discussed in this dissertation, especially in chapter 5, were preliminary outcomes as most of the projects were still ongoing at the time of the distribution of the survey. Conducting a retrospective study could help to better link networking practices to final outcomes such as revenues and product development – or lack thereof, and to build a better understanding of how networking practices steer outcomes and are informed by them. The

disadvantage of a retrospective study would be that it would not allow for the examination of networking practices 'in the heat of the moment' and would likely imply memory bias in the case of retrospective interviews.

Analysis of empirical material

To make sure that the findings and conclusions were adequately supported by evidence, I worked to 'dwell in' my data (Yanow, 2006). I did so by many times reading and rereading the documents, interviews, and observations that lay at the basis of my empirical studies. This rereading helped me to become intimately familiar with the empirical material and understand in-depth what went on in the cases. Coding and recoding the material helped to further 'dive into' the materials and get acquainted with them. Furthermore, coding helped to systematically analyze the data and ground my findings in discovered patterns, instead of idiosyncratic insights. Additionally, working 'abductively' (Yanow, 2006), i.e. going back and forth between empirics and literature, helped to better understand the empirics and learn things that were new to the theoretical debates to which I aimed to contribute.

Furthermore, I tried to remain 'experientially faithful' (Yanow, 2006), which is to make sure the studies reflected the views of the project participants and were recognizable for them, not merely based on my idiosyncratic interpretation as a researcher. The triangulation of methods, i.e. the combination of observations, interviews, document study, and the survey, helped to build a comprehensive account of the networking by the different parties and to decrease the chance for a lopsided account. I did so too by treating all respondents as equally important, to not be biased towards one or two dominant views ("horizontalization", Sandberg, 2005). Conversations with project participants during observations throughout the data collection, on top of the interviews, helped to gain more insight in what was going on within the projects and helped to cross-check earlier interpretations of situations. Finally, I presented the papers/chapters several times during the project to the funding agency that partly financed the project so as to 'member check' (Schwartz-Shea, 2006) my interpretations.

An important part of interpretive research is situating it within a certain epistemic, interpretive community and gaining feedback from that community to go against idiosyncratic interpretations (Schwartz-Shea, 2006). I did so in multiple ways. First, the research design was critically assessed by an evaluation committee of my research institute after the first nine months. I improved the design according to their comments. Second, from the outset to the very end of the project I discussed the research design and analyses with my supervisors on a regular basis. As such, I reflected on and accounted for my analyses and interpretations. This not only worked to embed the papers/chapters in current

theoretical debates, but simultaneously helped to account for alternative explanations and views. I did so as well in the methodology section of each chapter to formulate how I came to my findings and reached my conclusions. Third, attending courses on research design and different theoretical approaches helped shape my insights and skills in setting up and conducting the research. Fourth and finally, feedback received from presentations on several (international) conferences and submissions to journals helped to sharpen the contributions and embeddedness in the research community of the different papers/chapters.

Finally an important aspect of interpretive analysis is the acknowledgement that knowledge and the person generating that knowledge cannot be separated (Yanow, 2006; Schwartz-Shea, 2006). Throughout the research I was aware that I am a young, female, Dutch PhD candidate who collected and interpreted the empirical material. This for instance led me to be sensitive to the role of PhD students in the projects, as I identified with them. Moreover, having an interest in critical management studies I was sensitive to the power dynamics in the projects, which led me to eventually devote a chapter to this aspect of the projects. Also, as discussed in the gender chapter, I acknowledged that my being a woman (with feminist ideals) made me susceptible to gender issues, which helped but also impacted my data collection and analysis.

Diversity

The final point of reflection is related to how I conceptualized diversity. I studied two 'types' of diversity: functional and gender. The empirical material hinted at how other social identity aspects may also be salient for the engagement in networking practices. For instance, though the projects were located in the context of the Netherlands, several participants (both scientists and industrial representatives) had a foreign background. Cultural diversity, language and integration were topics discussed several times during interviews as potentially relevant diversity aspects. This raises the question how nationality plays a role in networking practices, which future (critical) research could pick up. Furthermore, the project participants were predominantly white, which triggers the idea for future research to study both positive and detrimental networking practices related to ethnicity, similar to the gender study conducted in this dissertation. Furthermore, do differences exist in networking practices based on age, and how do young and old employees benefit from or are disadvantaged by their and others' networking practices? Additionally, instances in my research hinted at how intersectionality could be intriguing for studying networking practices: in chapter 4 we saw, for instance, how the intersection of gender and function disadvantaged a woman program officer. Intersectionality is

a concept used to indicate how the intersection of social categories, such as gender and race, shape people's experiences (Crenshaw, 1991) within and outside organizations. This concept could provide an interesting new angle to study how diversity impacts on networking between people and subsequent reproduction or challenge of inequalities.

Practical considerations and recommendations

In the light of 'practice what you study', I will now go into the value of my study for practice and suggest recommendations. With my practice research I hope to have provided a 'mirror', or perhaps better said, a 'magnifying glass', for university-industry collaboration 'practitioners' – scientists, industrial representatives, funding agency officers, policy makers – and other organizational actors to reflect on and better understand what goes on in their networks. I will discuss four areas for which I elaborate on the practical value and recommendations based on my research: outcomes of networking; political networking; gendered networking; and becoming 'a good scientist'.

Outcomes of networking

The first practical consideration is revolved around the definition of success of a collaboration project, in particular in university-industry context. From the survey conducted in the study we learned that 'success' of university-industry projects is multi-layered, of which the two main goals that drove the networking practices between the different parties in the collaborations were knowledge development and university-industry network building. To gain an accurate idea of a project's success, one should therefore not only look at quantifiable indicators such as publications, patents, or revenues, but also at the 'quality' of network building and future prospects for the networks involved. With quality I mean the extent to which relationships are built or further developed, the scope (i.e. the project and/or outside), and durable (i.e. extending outside the project). Additionally, examining the perceptions of the different parties, I concluded that 'success' of a project is different for each party. This implies that to understand the outcomes of a project and gain a holistic picture of the extent of success or failure of a project, not a single-sided evaluation should be done, but each party's interests should be taken into account in the evaluation.

Political networking

My research showed how networking practices are socio-political. In that vein, the second practical consideration is related to the in- and exclusion of actors and the way in which the participation of actors in a network is informed

by power. This implies for instance that measuring network structures as a managerial mechanism for control gives only a partial idea of what goes on in an organization's networks. On the basis of my research I suggest that besides measuring interpersonal network structures, it would be useful for managers to also pay attention to how those organizational networks come about. This can provide insight in whether employees' networking practices prioritize certain parties and exclude or marginalize other (relevant) parties, or whether politics inhibit or stimulate the building of networks between certain parties. It is relevant to let not only informal interpersonal networks guide the building of formal (inter)organizational or university-industry networks, as this would risk excluding relevant actors, but also to keep an eye out for potentially peripheral actors and include them formally. This starts with building the awareness that what happens 'around the table' in organizations, and in particular of collaborations, is political.

From my research I learned that the way in which the networking between the scientists and industry representatives was managed, impacted the direction of the interpersonal and inter-organizational relationship building, and thereby the course and outcomes of the collaboration projects. In the light of the political nature of networking practices, facilitators and participants alike could consider how to make sure that collaborations are organized in such a way that parties from all sides gain optimal benefit from collaboration, i.e. to ensure that procedures and materials facilitate equal opportunity for input and benefits. Establishing common goals and a project set-up that benefits both seems a basic premise for equal opportunity for participation in projects such as the ones I studied. To then achieve those goals requires room for both parties to provide input and negotiate. This room is built, among others, by facilitating informal relationship building and knowledge transfer from the bottom up, as we also argued in the development of the notion of a 'third space' in chapter 3.

Moreover, being aware of and examining how objects used in networking practices, such as meeting agendas and progress reports, are not only instrumental but also symbolic 'carriers' of power, can help to challenge possible inequalities and balance power relations. Documents and procedures employed for helping the development of interpersonal and inter-organizational networks could be reconsidered from a critical point of view: how may (the use of) these documents and procedures contribute to an imbalance of input or output, and how can that be changed so there is room for equal participation in a (project) network? Recommendations based on my research would be to reconsider: the (order of) topics of collaboration meeting agendas, for instance, to examine whether some actors are advantaged and others disadvantaged by the way in which a meeting is structured; the assignment of project leadership

to certain actors; the location where project meetings are held; the persons involved in and responsible for writing project proposals.

In the particular case of university-industry collaborations, the funding agency has an important role to play in this respect. I learned that a funding agency is more than money provider or economic capital provider (Braun, 1998), as an agency also builds and uses social and cultural capital through its (program officers') networking practices. The agency sets agendas, norms, rules, and values (chapter 3), while at the same time it is a network facilitator (Hanna & Walsh, 2002; Benner & Sandström, 2000). A funding agency has the possibility through its procedures and materials to balance power relations between different actors, and enable equal participation and benefits. In facilitating university-industry networking, funding agencies may examine, for instance, how their documents and procedures may contribute to the maintenance of skewed participation, and second, grow the awareness of their representatives with regard to the political and gendered networking practices that they and other project participants engage in, reflecting also on the potentially detrimental effects of those networking practices.

Gendered networking

The third practical consideration concerns gender and networking. The funding agency as a policy maker and subsidy provider could also play an important role in improving the gender balance in the technology field, through its rule-, agenda-, norm- and value-setting role. Funding agencies as influential economic capital-providing intermediaries have a regulatory and potentially transformative ability: through their procedures and demands funding agencies can construct and change the institutional order of academic research systems (Benner & Sandström, 2000). This implies that they may also have the ability to influence the gender order in research systems through their procedures and demands: through for instance setting up measures to increase the number of women in committees and project groups, or through obliging participants to take gender into account in the writing of the research proposals (both network and content-wise). Concerning the latter, for instance, recent years have seen an increase in the integration of gender in the funding of health research (Johnson, Sharman, Vissandjée, & Stewart, 2014), which is exemplified by the recent Horizon 2020 research program which obliges researchers to include gender. As a subsidy provider and public actor in the technology field, a funding agency draws up a framework of rules and requirements for the projects, which could give room to make gender issues visible and tackle them. At least, becoming aware of its own neglect or unawareness of the issue could be a step towards contributing to change to more gender balance.

The agency could take measures not just inside the projects it facilitates (e.g. through procedures, criteria of subsidies), but also – or perhaps, necessarily - outside of its core tasks (through their communications, contributing to educational programs, displaying a certain image of technology). A role could be assigned to program officers, who through their networking practices can influence who apply projects for research grants, and thus have the opportunity to increase the number of women project leaders in the projects by stimulating women to apply for grants. Their attitude toward and knowledge of how gender plays a role in and around their project networks is therefore important for the advancement toward a more inclusive culture. Based on my research, I found that the officers seemed to have limited gender knowledge and awareness. Measures such as gender training may increase awareness and sensitivity to the role of gender in the technological sector and in micro-interactional situations. This gender training may exist of tests such as The Implicit Association Test*; workshops on what gender is, how gender is learned through socialization, and how gender stereotypes influence and are reinforced by micro-level behaviours and macro-institutions; the gender tool box of the EU†; or round table sessions in which men and women discuss issues and experiences they have had with gender practices. Gender training can help to give insight in the biases we unconsciously have and use in interactions, provide knowledge and more understanding of other people's experiences, and help to change perceptions, attitudes and behaviours regarding gender and consequently, gender inequalities.

The insight based on my research that gender is done through the way in which people build relationships with each other, may help organizational actors to reflect on their own networking practices and how they may be detrimental to some, whereas beneficial for others – gender-wise but also related to other social identity aspects, such as ethnicity, nationality, or age. Gaining awareness to the effects of these small moments of interaction and one's own role in these interactions can already be a start to diminish the potential disadvantages for women as a minority and to increase the number of women in men-dominated fields.

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* *https://implicit.harvard.edu/implicit/takeatest.html (US)*
https://implicit.harvard.edu/implicit/netherlands/ (NL)

† *http://www.gendertoolbox.org/toolbox/toolboxEN/indexEN.html*

Becoming a "good scientist"

The fourth and last practical consideration is related to the identity of one specific group of participants in the university-industry collaborations: researchers, or, "being a scientist". In the current climate of increasing emphasis on value of science for society and the increasing (call for) industrial funding of scientific research, I see that the meaning of 'being a good scientist' is changing. Based on my study I note how this holds that scientists not only need to identify with and learn their own professional/scientific practices, norms, and goals, but also have to get to know and understand the goals and norms of those other parties, especially of industry. In my study I noticed how some scientists accepted this and used it to their own advantage - though not always without tensions - whereas others challenged these changes and held on to purely scientific practices and goals. This sometimes led to resistance and (deliberate) neglect to include industrial interests on the side of the researchers, for instance when a senior researcher in MediPro explicated his disinterest in commercialization of a developed instrument. Scientists become more dependent on money from industry, whereas at the same time they need to guard keeping their academic independence and integrity. They find themselves in a quandary, which has in it the risk that the meaning of 'good science' is pushed into a narrow mould that may inhibit innovation rather than stimulate it. An important question for the future is, how can policies and organizations such as the funding agency in my study, but also scientific institutes and industry, facilitate the societal impact of science, while at the same time not compromise the integrity of science?

Another point in this regard is that I noticed how new entrants in the scientific field, i.e. PhD students, are required to learn this changing notion of a 'good scientist'. For the quality of the networking between science and industry, the ties between PhD students – the executors of most research - and industry is relevant. As a PhD trajectory is an important phase for the identity formation of early career researchers, this makes it a suitable period for learning about the possibilities and the tensions when building relationships with industry. I do not wish to say that PhD students need to learn to uncritically follow industry's wishes. I suggest that in the current climate of increasing emphasis on practical relevance, they will need to learn how to balance the inclusion of practical interests with safeguarding the scientific quality of their research.

From the observations and structural analysis (chapter 5) I noted how some PhD students became central in the networks, whereas others refrained from bonding with industry. The survey furthermore showed that the goals of building ties with industry and practical applicability of results were low on the PhD candidates' list of priorities. PhD students gave priority to learning 'traditional' academic practices. Different parties could contribute to strengthen the

awareness of PhD students to include practical considerations in their work and become the new "good scientist". Senior scientists can for instance point junior scholars to the importance of establishing good relationships with industry; they can stimulate PhD candidates to visit and contact industry partners; invite industry to present their goals and practices so PhD candidates understand the use of their research for practice. Funding agencies can, as the agency in this dissertation did, require regular meetings in which PhD candidates and industry partners participate; arrange for PhD students to collaborate with or even work within industry; train PhD candidates in presenting to non-scientists. Industry partners could invite these junior scholars to their premises to show the practical application of theoretical knowledge, work together with junior scholars on measurements and product development to exchange knowledge, or let junior scholars work in their organizations to establish bridges between science and industry.

Concluding remarks

In this dissertation, I have further developed the notion of networking as a practice to build a better understanding of how organizational networks are built and developed, and to build a critical perspective on networking practices. I studied the networking practices between university scientists, industry representatives, and funding agency officers, but the ideas and arguments I discuss in this dissertation go further than that context alone. The study has helped me explore what it is that people do when they build relations with one another and how that is embedded within different structures. My study provides insight in what we as organizational actors do when we build, maintain or perhaps keep off relationships with other people, in an (inter)organizational context, and shows that it is not only the enabling and constraining framework of our network structures that impact on our networking practices, but also structures such as the social systems in which we move and the gender order that is present throughout those systems.

There is more to networking and diversity than '*having*' a network with people with '*a different view*', as the opening quote of my dissertation suggested. I have shown that networking is more than deliberately selecting parties for instrumental purposes: the social always plays a role as well. Why and how we build relationships with other people is influenced by many factors: the goals we have, our identities, the organization of work, our place in the hierarchy, the room we get to build networks, our position in a network, prior relations, power relations, gender. This can have positive consequences, such as the production of durable relationships that provide all parties with a win-win situation, but can also have negative consequences, when inequalities in networks are (re)

produced that render relationships to not be optimally deployed or used or be beneficial to all. That, in turn, can impact the outcomes of networks - in this dissertation, of university-industry collaboration projects. Our networking practices have an impact on ourselves and on our relations with others: our position in the network, the nature of our ties with others, outcomes of the networks we are in, social inequality. Realizing and building on these insights may help to reap the fruits of interpersonal relations in a situation of a diversity of actors, in which we more and more find ourselves.

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Appendices

A. Interview guide

Participation in project:

- Project leader: As the project leader, you have did the project application and included industry partners. How did this go about? Who took initiative?
- All other participants: How did you get included and involved in the project?
- Do you have more experience with participating in such a project?
- What is the goal of the project?
- Why do you participate, what are your goals?
- How much time and effort do you put into the project?
- What are your role and input in the project?
- How is the project proceeding so far? Are goals reached, is it going according to expectation?

Relationships within the project group:

- How would you describe the relations within the project group? Would you say they are informal of formal, business-like? Could you describe the atmosphere during project meetings?
- How do you see the role of industry in the project?
- How do you see the role of the project leader in the project?
- How do you see the role of the funding agency program officer in the project?
- How do you see the role of the researchers in the project?
- Systematically with the help of project participants list:
- How have you gotten to know this person?
- Do you have contact with this person, about the project or otherwise?
- When, how often, about what, with what purpose, and how?

Other questions:

- The central concept in my study is networking. What do you see as networking in the frame of this project, and is it relevant?
- Another important concept in my research is diversity. What is diversity in the frame of this project, and is it relevant for a project such as this?
- This project has one or two women involved. Is that a relevant aspect of diversity to you? Why (not)? (Same question for age, nationality)
- What would enhance the project? Consider project group composition.

B. Observation guide

- Project, date, time, location
- What does the room look like?
- How are the people dressed?
- Who sits where? (drawing)
- What do people do when they first come into the meeting?
- What activities do people perform to choose seats and sit somewhere?
- What do people do during breaks? Who talks to whom during coffees and breaks, and about what?
- Who leads conversations and how?
- Who leads the meeting and what activities does that person perform to lead?
- Who made eye contact during the meeting with whom? At which moment?
- Who whispers with whom and how? At which moment?
- Who makes jokes, to whom, and how? At which moment?
- Who remains silent, and who is dominantly present?
-

C1. Set-up of survey

Network measurement

One part of the survey included the measurement of the social networks at t=1. We introduced this part with a short explanation of what was asked of the respondent, and to fill in their name and affiliation. The first question we then asked was, "With which persons did you have contact in the last six months about this specific project outside of the [funding agency's] project meetings? (Multiple answers possible) You can think about persons both within the project group, as well as outside of the project group (for instance people from within your own organization)", followed by the question to indicate for those persons "What was the frequency of that contact over the last six months?" (daily, weekly, monthly, once, taken from Reagans & McEvily, 2003) and "what was this contact about? For instance: project meeting on research content; administrative things; joint measurements; material exchange, etcetera)". The second question we asked "With which persons involved in the project group did you have contact in the last six months about other things besides this project?" and again, for those persons "What was the frequency of that contact over the last six months?" (daily, weekly, monthly, once) and "how would you characterize the nature of this contact: formal, informal, or both formal and informal?" As the network analysis required a list of project participants - using the most recent project participants lists - for collecting the socio-metric data, the survey was adjusted to each project.

Project evaluation

The other part of the survey included an evaluation of the project's progress and accomplishments. We measured this in several ways. First, from the interviews and application documents (including letters of support by the industry representatives) we derived project goals. We coded the goals first by party (project leader, program officer, PhDs/post docs, users) and then brought these goals back to seven overarching goals: knowledge development, publications, added value for practice, enhancement of industry market position, industry-university network building, scientific network building, and (academic) career enhancement. In the survey we asked of these seven goals, which the participants had had when they started their participation. We also gave them room to come up with their own goals. After they had indicated their initial goals, we asked them to rate the level of accomplishment of that goal in the project (up to then): completely accomplished, partially accomplished, not accomplished, no opinion/not applicable. We also asked to what extent they trusted their goals would still be accomplished in the rest of the project, on a

scale from very little confidence to much confidence.

Second, we asked whether the respondents believed the formal project objective had been reached, and to what extent they were satisfied with the project. We also gave them space to explain their level of satisfaction (open question). Third, we set up seven statements to measure perceptions on the project process (frame).

The answer categories ranged from "completely disagree" to "completely agree" on a 5-point Likert scale, and we added "not applicable" and "no opinion" as a category in case respondents did not want to or were not able to fill in their answers for any reason.

Frame C1: Statements on perceptions of project's progress

- Thus far I have seen plenty of interaction between the researchers and the industrial representatives.
- I expect that on the short term (during the project) the interaction between researchers and industrial representatives will increase.
- I expect that on the long term (after the project) the interaction between researchers and industrial representatives will continue.
- The project has contributed to the building or strengthening of a sense of community among the researchers and industrial representatives.
- [The funding agency] has an important role in the development of a network between the scientific researchers and the industrial companies.
- I have had the opportunity to help determine the direction of the project.
- I have had enough room within the project to bring input to the course of the project.

C2. Final survey (Dutch)

Project survey [number]

Q1 Hartelijk dank dat u deel wilt nemen aan deze vragenlijst over het project "[insert title project]" (insert number project).
Wat is uw functie of rol in dit project?

- ❑ Projectleider
- ❑ Mede-projectleider/begeleider
- ❑ Uitvoerend onderzoeker: PhD of postdoc
- ❑ Industrievertegenwoordiger/lid van gebruikerscommissie
- ❑ STW program officer
- ❑ Anders, namelijk: _____

Q2 Met welke doelen bent u aan dit project begonnen? (Meerdere antwoorden mogelijk)

- ❑ Publicaties
  (conference papers, journal articles, professional publications, PhD thesis, patent etc.)
- ❑ Kennisontwikkeling
  (door onderzoek te doen of te ondersteunen)
- ❑ Toegevoegde waarde voor de praktijk
  (bijv. een tool, instrument, model,software)
- ❑ Netwerk tussen wetenschappers bouwen en/of onderhouden
- ❑ Bouwen en/of onderhouden van netwerk tussen universiteit en industrie
- ❑ Verbeteren marktpositie
  (ontwikkeling nieuwe markt, ontwikkeling/verbetering producten, etc.)
- ❑ Stimuleren wetenschappelijke carrière
  (onderzoeksprojecten - in de toekomst - mogelijk maken, onderzoekslijn opbouwen, PhD verkrijgen, persoonlijke ontwikkeling, etc.)
- ❑ Anders 1, namelijk _____
- ❑ Anders 2, namelijk _____
- ❑ Anders 3, namelijk _____

Q3 In hoeverre zijn deze doelen (tot dusver) bereikt in het project?

	Niet bereikt	Deels bereikt	Helemaal bereikt	Weet ik niet
Publicaties *(conference papers, journal articles, professional publications, PhD thesis, patent etc.)*	❑	❑	❑	❑
Etcetera	❑	❑	❑	❑

Q4 Het project heeft een formele doelstelling, welke is geformuleerd in de projectaanvraag en herhaald in de voortzettingsrapportages gedurende het project:"[insert project objective(s)]"
In hoeverre vindt u dat deze doelstelling gehaald is (tot dusver)?

❑ Niet bereikt (1)
❑ Deels bereikt (2)
❑ Helemaal bereikt (3)
❑ Geen mening/Niet van toepassing (4)

Q5 Hoe tevreden bent u over het verloop van het project?

❑ Zeer ontevreden (2)
❑ Ontevreden (3)
❑ Tevreden (5)
❑ Zeer tevreden (6)
❑ Niet tevreden, niet ontevreden (7)

Q6 Zou u dit kunnen toelichten?

_____

_____

Q7 Wat verwacht u dat het project nog voor u en/of uw organisatie gaat opleveren? (Meerdere antwoorden mogelijk)

❑ Publicaties
(conference papers, journal articles, professional publications, PhD thesis, patent etc.)
❑ Kennisontwikkeling
(door onderzoek te doen of te ondersteunen)
❑ Ontwikkeling tool, instrument, model,software, etc. voor de praktijk
❑ Netwerk tussen universiteit en industrie bouwen en/of onderhouden
❑ Netwerk tussen wetenschappers bouwen en/of onderhouden

❑ Bouwen en/of onderhouden van netwerken tussen industriële partijen
(contacten met concullega's en toeleveranciers)
❑ Verbeteren marktpositie
(ontwikkeling nieuwe markt, ontwikkeling product, contacten met concullega's en toeleveranciers, etc.)
❑ Stimuleren wetenschappelijke carrière
(onderzoeksprojecten - in de toekomst - mogelijk maken, onderzoekslijn opbouwen, PhD verkrijgen, persoonlijke ontwikkeling)
❑ Anders 1, namelijk _____
❑ Anders 2, namelijk _____

Q8 In welke mate heeft u er vertrouwen in dat het project deze doelen zal realiseren?

❑ Heel weinig vertrouwen
❑ Weinig vertrouwen
❑ Voldoende vertrouwen
❑ Veel vertrouwen

Q9 Het doel van deze vragenlijst is het analyseren van het netwerk van het project, bestaande uit alle onderzoekers, industrievertegenwoordigers, en andere betrokkenen. Om deze reden verzoek ik u om hieronder uw naam en organisatie in te vullen, en in de lijst daarna aan te vinken met welke personen u het afgelopen half jaar contact heeft gehad over het project. Zoals ook eerder vermeld, behandel ik deze gegevens uiteraard strikt vertrouwelijk: ik zal alle deelnemers anonimiseren, zodat de gegevens en resultaten niet naar u of uw organisatie te herleiden zijn.
Vul hier uw naam en organisatie in:

Naam _____
Organisatie _____

Q10 Met welke mensen heeft u in het afgelopen half jaar contact over dit specifieke project gehad buiten de STW projectvergaderingen om? Denk hierbij zowel aan mensen binnen de projectgroep als daarbuiten (zoals mensen binnen uw eigen organisatie).

❑ [Name project leader] _____ – [name university] _____
❑ etc. _____
❑ Iemand anders, namelijk _____

Q11 Hieronder vindt u de lijst van mensen die u hiervoor heeft aangevinkt. Kunt u voor elk van die personen aangeven

1. wat de frequentie van dat contact was

2. waarover dat contact ging, bijvoorbeeld: inhoudelijk project overleg; administratieve zaken; samen metingen doen; uitwisseling materiaal, etcetera

	Wat was de frequentie van dat contact over het afgelopen half jaar?				**Waarover ging dat contact?**
	Eenmalig (1)	Maandelijks (2)	Wekelijks (3)	Dagelijks (4)	Globale inhoud: (1)
[name project leader]	❑	❑	❑	❑	❑
…..etc.	❑	❑	❑	❑	❑
Iemand anders, namelijk …	❑	❑	❑	❑	❑

Q12 Met welke mensen binnen dit project heeft u in het afgelopen half jaar contact gehad over andere zaken dan dit project?

❑ [Name project leader] _____ – [name university] _____

❑ etc. _____

❑ Iemand anders binnen het project die niet op de lijst staat, namelijk _____

Q13 Hieronder vindt u de lijst van mensen die u hiervoor heeft aangevinkt. Kunt u voor elk van die personen aangeven

1. wat de frequentie van dat contact was

2. hoe u de aard van dat contact zou karakteriseren: formeel of informeel (of allebei)

	Wat was de frequentie van dat contact over het afgelopen half jaar?				**Wat was de aard van dat contact?**	
	Eenmalig (1)	Maandelijks (2)	Wekelijks (3)	Dagelijks (4)	Formeel (1)	Informeel (2)
[name project leader]	❑	❑	❑	❑	❑	❑
…..etc.	❑	❑	❑	❑	❑	❑
Iemand anders binnen het project die niet op de lijst staat, namelijk …	❑	❑	❑	❑	❑	❑

Q14 Tenslotte, zou u kunnen aangeven in hoeverre u het eens bent met de volgende stellingen over de interactie tussen universiteit(en) en industrie-vertegenwoordigers?

	Hele-maal mee oneens	**Mee oneens**	**Noch oneens, noch eens**	**Mee eens**	**Hele-maal mee eens**	**Niet van toe-passing**
Ik zie (tot nu toe) binnen het project veel interactie tussen de onderzoekers en de industrievertegenwoordigers.	❑	❑	❑	❑	❑	❑
Ik verwacht op korte termijn (dus binnen het project) een toename van interactie tussen de onderzoekers en de industrievertegenwoordigers.	❑	❑	❑	❑	❑	❑
Ik verwacht op de langere termijn (na het project) een voortzetting van interactie tussen de onderzoekers en industrievertegenwoordigers.	❑	❑	❑	❑	❑	❑
Het project heeft bijgedragen aan het bouwen of versterken van een gemeenschapsgevoel tussen onderzoekers en industrievertegenwoordigers.	❑	❑	❑	❑	❑	❑
STW speelt bij de ontwikkeling van het netwerk tussen de onderzoekers en de industriële bedrijven in dit project een belangrijke rol.	❑	❑	❑	❑	❑	❑
Ik heb voldoende ruimte (gehad) om inbreng in het project te hebben.	❑	❑	❑	❑	❑	❑
Ik heb voldoende mee kunnen bepalen in welke richting het project gaat.	❑	❑	❑	❑	❑	❑

Q15 Dit was de laatste vraag van de vragenlijst. Hartelijk dank voor het invullen! Klik op de pijl rechtsonder om uw antwoorden te versturen. Heeft u nog opmerkingen over dit project? Deze kunt u eventueel hieronder plaatsen:

D. Statement on contributions

I hereby declare that I am the only author of this dissertation, which the fact that it was structured in article format with co-authors does not undermine. Reformulated in paper writing terms, I was the first author for every paper and chapter included in the thesis. As is common in PhD trajectories, I came up with the ideas, designs and drafts of the different papers, which I then sent to and discussed with my supervisory team (promotor and copromotor). I conducted all the empirical work myself, as well as the analysis of the collected materials. I also presented the papers on different conferences myself, as the only presenter. The role of my supervisors throughout the trajectory was to regularly critically examine and reflect on my ideas, texts, and analyses, and thereby teach me the finesses of writing academic papers and take a helicopter view regarding my research as a whole and the connection between the different chapters/ papers. During each of those discussions I decided in good collaboration with them on the next steps needed to further develop (i.e. strengthen, sharpen, tone down) the different papers. Because of this involvement as my PhD supervisors in my thought and writing processes, I added them as co-authors to each of my conference papers and the journal article that has just been accepted for publication. This is common practice in the Institute for Management Research.

A general outline of the project was written by my supervisors and approved by the funding agency which co-financed my project. I then applied for this project. In line with the research institute's PhD protocol, in the first eight months of my project (Sept 2010 – May 2011) I worked on reading relevant literature and writing a research proposal with that outline as a guiding framework, which I then had to present to and which had to be approved by the institute's Scientific Committee. The proposal received a "B", which meant I had to rework some of the proposal before it could be approved. One of the remarks was that I mentioned 'networking practices', but that this concept was not explained well. An important change I subsequently made was to read and include practice studies in my research. It was then that I built the idea of developing the notion of networking as a practice which became the guiding objective of my research project. The revised proposal with the first elaboration of this idea received an was approved in the next round.

Chapter 2, on networking as a practice, was a further exploration of this still rather abstract idea of networking practices based on empirical material. I used initial observations of project meetings to get a concrete picture of what networking practices actually are. This was a prelude to the later chapters, in which I highlighted these practices from different perspectives. This idea of highlighting different angles thus emerged through time as I wrote the different papers and together with my supervisors took a helicopter view of my project.

I submitted this paper in January 2012 to the Conference of AoM, which was accepted for presentation. I presented the paper by myself. In a later stage of the project I rewrote parts of the paper, among which the analyses, to further improve the paper as a result of advanced insights.

Chapter 3, on power and networking, was not planned from the start of my PhD, but emerged as I was working on the collection of the empirical material and the analysis for chapter 2 and 4. I came up with the idea to use Giddens' theoretical power framework, and applied it to the analysis of the case. My supervisors then helped, as for the other papers, to bring the theoretical and the empirical part more in line with one another. I presented this paper by myself at the Conference of EGOS in 2014, where I received valuable feedback. It was with this paper and the next that I realized I was developing a critical management perspective on the networking practices under study. I later put this on paper and named this a critical diversity perspective in my general introduction.

Chapter 4, on gender and networking, was actually the second paper I wrote, which I started writing after I had handed in my paper for AoM in January 2012. Taking a gender perspective on networking as a practice made sense as 'diversity' was already part of the initial outline of the project, as gender is an interesting aspect of diversity in the technological sector, and as gender and feminism have my greatest interest. I wrote the introduction and theoretical framework, using Martin's framework of practicing-practices, which me and my supervisors first had to untangle ourselves to understand what it actually means (one of Professor Benschop's invented metaphors helped considerably). Once I started analyzing – which was not the easiest process as I had to learn to wear a gender lens myself – we could use the empirical material to make that framework clearer and be able to show how this theoretical framework works in practice. I presented this paper at the Conference of Gender, Work and Organization in 2012, again by myself. The paper has been recently accepted for publication in the Journal of Gender, Work, and Organization. For this paper, I sat down with both of my supervisors two or three times to actually co-write and refine the introduction and the discussion of this paper. These were very informative sessions that helped me improve my academic writing skills.

I had the initial idea for Chapter 5, on network dynamics, already after my presentation of paper/chapter 2 at the Conference of the Academy of Management in 2012. It was there that one of the audience members expressed his interest in the topic and stated that a networking-as-practice approach had the potential to explain network-level developments. After the conference it was this remark that stuck with me and one of my supervisors who had attended

the session as audience, and together with my supervisors I discussed how this could become a paper that could bring something new to the network field. I already wrote bits and pieces of this paper while working on the paper on networking as a practice, but I did the actual writing of chapter 5 in my last year (Oct 2013 – April 2014) while I also collected the survey data. I set up the survey by myself, and gained feedback from my supervisors and asked for feedback from other colleagues who were familiar with survey research as well. Following several feedback sessions with my supervisors – as with all other papers - I fine-tuned and sharpened the chapter until it emerged in its current shape. This meant scraping out quite some theoretical edges and angles and focusing on one relation only, namely the one between networking practices and changes and stabilities in network structures.

Finally, Chapter 1, Introduction, and chapter 6, Conclusions, I started writing during my final year. The process for these two chapters were no different from the others in the sense that I set up the general structure and wrote the text, to which my supervisors provided comments. I came up with the theoretical framework (i.e. combining the networking as practice approach with a critical diversity perspective), which I had to rewrite mainly concerning my ambiguous stance regarding critical and mainstream diversity views. In the conclusions, it were my supervisors who came with the idea that I developed a theory of networking practices, which I then worked out and got their feedback on. One of their comments was that the 'dynamic' nature of networks (i.e. chapter 5) was not placed enough emphasis on, so I incorporated that more into the conclusions. Their other large remark regarded my implication section, which was too much written as if my readers came from a positivist instead of an interpretivist research background. I then rewrote this entire section to better fit my own research paradigm, which is part of the latter.

In addition to the feedback from my supervisors and the conference presentations, I presented the papers at several other occasions from which I also received feedback, such as the PhD research days of the Institute for Management Research. In my first year I presented my project as a whole at the NOG, the Dutch research school for gender studies at the University of Utrecht. Moreover, every year I visited the funding agency together with my supervisors to show my progress and share insights. The steering board of the agency read my papers and approved, yet did not steer the contents of the papers in any way.

To conclude, the PhD trajectory has taught me what it takes to conduct research as an independent scholar. To reflect on the process and contents of my research with relevant others is an important part of that.

Nederlandse samenvatting

Mijn doelstelling in dit proefschrift is het verder ontwikkelen van de theoretische notie van *netwerken als een sociale praktijk*. De gebruikelijke manier van onderzoek doen naar (organisatie)netwerken is het in kaart brengen van netwerkstructuren en de posities en relaties van personen, organisatieonderdelen, of organisaties. Daarmee krijg je inzicht in de stabiele en duurzame patronen van interacties tussen actoren (Brass en Burckhardt, 1993) en mogelijk ook hoe die patronen veranderen (bijvoorbeeld Powell, White, Koput, en Owen-Smith, 2005). De openstaande vraag is echter: *hoe* komen die netwerken precies tot stand en hoe komt het dat zij zich ontwikkelen? De onderliggende gedachte van dit proefschrift is dat netwerken niet (alleen) een zelfstandig naamwoord is, maar ook een werkwoord. Kennis over het handelen van mensen ten aanzien van hun netwerken, de *"agency"* kant van netwerken, is nog onderontwikkeld (Benschop, 2009). Ik bepleit en laat zien in mijn proefschrift dat deze kennis wel van belang is, omdat netwerken op welk niveau dan ook in essentie gebouwd en ontwikkeld worden door de netwerkhandelingen van mensen onderling. Als we weten wat zij doen op inter-persoonlijk vlak om hun netwerken te bouwen, onderhouden, versterken, of misschien wel ontbinden, begrijpen we ook beter waarom organisationele en inter-organisationele netwerken de vorm hebben die ze hebben, wie welke vruchten plukt van een organisatienetwerk en wie niet, en hoe netwerken leiden tot bepaalde (on)gewenste uitkomsten.

Om deze kennis te genereren heb ik in mijn proefschrift de 'praktijkbenadering' (*practice-based approach*) voor netwerkonderzoek verder ontwikkeld, in navolging van onderzoek van o.a. Benschop (2009), Manning (2010) en Van den Brink en Benschop (2014). Bovendien pas ik een 'kritisch diversiteitperspectief' (*critical diversity perspective*) toe op mijn studie van netwerkpraktijken, om ook de minder zichtbare en potentieel nadelige kant van netwerken te onderzoeken. Ik zal eerst deze twee benaderingen uitleggen, waarna ik de onderzoekscontext en bevindingen bespreek.

De praktijkbenadering in organisatieonderzoek (Gherardi, 2012; Nicolini, Gherardi, en Yanow, 2003; Reckwitz, 2002; Schatzki, Knorr-Cetina, en Von Savigny, 2001) stelt dat, om te begrijpen hoe organisaties werken, we moeten kijken naar de sociale praktijken die organisatieleden uitvoeren. Wat zeggen en doen ze nu werkelijk in hun dagelijkse werkzaamheden? Welke bewuste en onbewuste patronen liggen daaraan ten grondslag? Dit soort onderzoek geeft inzicht in hoe organisationele concepten als strategie, routines, leiderschap, en gender geen statische, onveranderbare dingen zijn, maar hoe zij gevormd, 'gedaan', en geleerd worden in sociale interacties tussen mensen. Stabiliteit in organisatieprocessen ontstaat doordat organisatieleden 'dezelfde' praktijken leren en steeds opnieuw uitvoeren. Ik pas deze benadering toe op netwerken: ik

benader een netwerk niet zozeer als iets wat mensen *hebben*, maar wat ze *doen*. Door te vergaderen, 'small-talken', presenteren, samen te werken, op bezoek te gaan, te bellen, en ga zo door, bouwen, gebruiken en ontwikkelen mensen hun onderlinge relaties en daarmee dus hun netwerken.

Ik ga nog een stap verder in de ontwikkeling van de notie van netwerken als sociale praktijk. Benschop (2009) en Van den Brink en Benschop (2014) beargumenteren dat een praktijkbenadering van netwerken kan bijdragen aan ons begrip van hoe genderongelijkheden in netwerken ontstaan en in stand worden gehouden, of misschien wel veranderen. Door hun positie in 'instrumentele', 'affectieve' of 'support' netwerken worden vrouwen veelal benadeeld in organisaties, onder meer in hun mogelijkheden om op topposities te komen, zoals bijvoorbeeld in de wetenschap (Van den Brink 2010) of in de reclamewereld (Ibarra, 1992). Het onderzoek van Benschop (2009) en Van den Brink en Benschop (2014) valt onder de stroming van 'kritisch diversiteitonderzoek'. Dit soort onderzoek benadrukt en onderzoekt de machtsprocessen en ongelijkheden in organisaties onderliggend aan diversiteit. Door dit perspectief toe te passen in mijn studie, leer ik hoe machtsprocessen een rol spelen in netwerkpraktijken, op welke manier die praktijken worden ingezet voor politieke doeleinden, hoe zij worden gevoed door genderstereotypen, en op welke manier dit leidt tot het behoud of verandering van ongelijkheden in netwerken. Ik laat zien hoe de netwerkpraktijken van diverse actoren kunnen leiden tot inclusie- en exclusieprocessen, als ook het versterken van de positie van sommige actoren en het marginaliseren van anderen. Dit doe ik zowel wat betreft functionele diversiteit (wetenschappers, industrievertegenwoordigers), als voor gender (de ideëen van mannelijkheid en vrouwelijkheid die mensen op zichzelf en anderen projecteren en waarnaar mensen zich gedragen).

Context en empirisch materiaal

Om de notie van netwerken als een sociale praktijk verder te ontwikkelen, heb ik onderzoek gedaan naar de netwerkpraktijken van deelnemers aan universiteit-industrie samenwerkingsprojecten in de technologische sector in Nederland. De toenemende financiering van wetenschappelijk onderzoek door industrie en andere organisaties, tezamen met de groeiende nadruk op valorisatie en toepasbaarheid van wetenschappelijk onderzoek voor 'de praktijk', maken het noodzakelijk dat universiteiten en industrie elkaar weten te vinden en relaties met elkaar aangaan. Het is bekend dat informele relaties tussen wetenschappers en industrievertegenwoordigers een belangrijke rol spelen in het ontstaan van samenwerking en de overdracht van kennis (Bruneel, D'Este, en Salter, 2010; Gertner et al., 2011; Meyer-Krahmer en Schmoch, 1998; Swan, Scarbrough, en Robertson, 2003). Tezamen met de diversiteit van stakeholders

in deze samenwerkingsprojecten is deze context zeer geschikt om de notie van netwerken als sociale praktijk verder te ontwikkelen.

Voor het empirische deel van mijn proefschrift heb ik universiteit-industrie samenwerkingsprojecten onderzocht die gesponsord zijn door STW, de financier van technologische publiek-private samenwerkingsprojecten in Nederland. In mijn onderzoek heb ik zes verschillende samenwerkingsprojecten gevolgd gedurende een periode van ruim twee jaar. Deze projecten vielen allen onder STW, en behoorden tot drie verschillende sectoren: civiele techniek, werktuigbouwkunde, en medische technologie. Het casusonderzoek bestond uit kwalitatieve onderzoeksmethodieken: het afnemen van interviews, het doen van observaties van projectvergaderingen en enkele andere door STW georganiseerde evenementen, en het bestuderen van relevante gerelateerde documenten zoals agenda's, notulen, en voortgangsrapportages. Daarnaast heb ik de dataverzameling afgesloten met een vragenlijst voor alle projectdeelnemers. Op basis van de analyses van dit verzamelde empirisch materiaal heb ik vervolgens vier onderzoeksvragen beantwoord, welke ik nu achtereenvolgens zal bespreken.

Bevindingen

Hoe is netwerken een sociale praktijk?

In hoofdstuk 2 was het doel om mijn praktijkbenadering voor de bestudering van netwerken te introduceren. Op basis van dit hoofdstuk bleek dat hoe en met wie mensen aan hun relaties werken is ingebed in en wordt beïnvloed door culturele, organisationele, en professionele praktijken, en door de professionele identiteit van mensen. Het uitvoeren van netwerkpraktijken 'bevestigt' die praktijken en identiteiten. Bijvoorbeeld, het "zijn van een wetenschapper" bestaat uit het uitvoeren van bepaalde praktijken die geassocieerd worden met 'het doen van wetenschap': daaronder valt het bouwen van informele relaties met industrievertegenwoordigers door middel van samenwerkingsprojecten. Uit deze bevindingen concludeerde ik dat het handelen van mensen in hun netwerken niet begrepen kan worden zonder ook 'structuur' (niet alleen in netwerk-zin, maar ook in bredere zin) in ogenschouw te nemen. Dit hoofdstuk liet ook zien dat de netwerkenhandelingen tussen wetenschappers en industrievertegenwoordigers mogelijk gemaakt en tegelijkertijd in een bepaalde mal worden gegoten door de eisen en procedures die STW, de financier van de projecten, heeft opgesteld.

Hoe zijn de netwerkpraktijken in universiteit-industrie samenwerkingsprojecten gerelateerd aan macht?

Het doel van hoofdstuk 3 was een beter begrip te krijgen van hoe netwerkpraktijken tussen wetenschappers en industrievertegenwoordigers in de samenwerkingsprojecten gerelateerd zijn aan machtsprocessen. In dit hoofdstuk bleek

dat de wetenschappers en industrievertegenwoordigers in de onderzochte casus zich bevonden in een soort 'arena' van macht en politiek, met verschillende verdelingen van middelen (geld, relaties, zeggenschap) en 'regels', die maakten dat de partijen zowel betrekkelijk autonoom als afhankelijk van elkaar waren. Dit leidde ertoe dat zij naar zekere netwerkpraktijken grepen om de middelen te krijgen die zij nodig hadden om hun doelen te bereiken – middelen waarvoor zij afhankelijk waren van de andere partij, zoals kennis en expertise, maar ook tijd en geld. Ook leerde ik hoe in deze casus de vertegenwoordiger van de financier, STW, sociaal-politieke netwerkpraktijken uitvoerde om de projecten te sturen naar praktische toepasbaarheid van wetenschappelijk onderzoek – een van de hoofddoelen van de financier. Het onderzoek leerde me dat een dergelijke financier regelgevend, agendazettend, normstellend, en waardestellend is. Bovendien toonde het aan dat de program officer van de financier door de betrekkelijke outsider-positie de deelnemers niet kon dwingen tot het volgen van een bepaalde koers of om hen met elkaar te laten netwerken. Zij probeerde via 'kleine' netwerkhandelingen en met behulp van diverse instrumenten de netwerken tussen de wetenschappers en de industrievertegenwoordigers te faciliteren en te bemiddelen, om zodoende invloed te hebben op de gang van zaken in de projecten. Al met al leerde dit deelonderzoek me dat netwerkpraktijken politiek zijn en onderdeel van machtsprocessen. Ik eindigde dit hoofdstuk met een verkenning van het idee van een 'derde ruimte' tussen wetenschappers en industrievertegenwoordigers, gefaciliteerd door derden zoals overheidsfinanciers, waardoor de partijen bruggen kunnen bouwen en kunnen werken aan machtsgebalanceerde ontwikkeling van innovatie.

Hoe zijn de netwerkpraktijken in universiteit-industrie samenwerkings-projecten gerelateerd aan gender?

In hoofdstuk 4 was de doelstelling bij te dragen aan de kennis over gender in netwerken door te onderzoeken hoe mensen gender 'doen' via hun netwerk-praktijken. Ik observeerde in dit hoofdstuk hoe actoren gender 'deden' door bijvoorbeeld met een grap te verwijzen naar de gender van een man of vrouw tijdens de small talk gedurende de koffiepauze, of door te vragen of een vrouwelijke hoogopgeleide professional de secretaresse is. Dit soort netwerk-momenten bevestigen veelal genderongelijkheid en de genderpraktijken die cultureel beschikbaar zijn voor ons, zoals "mannen zijn sterker dan vrouwen" of "vrouwen zijn socialer dan mannen", die vrouwen (en mannen) in een soort keurslijf stoppen en hun mogelijkheden beperken. Soms gaan mensen ook tegen gender stereotypen in door middel van hun netwerkpraktijken, zoals wanneer een vrouw de leiding neemt in een door mannen gedomineerde netwerk. De manier waarop we relaties bouwen met anderen kunnen daarom

onbedoelde, mogelijk nadelige, gevolgen hebben voor bepaalde actoren, zoals vrouwen, in een netwerk. Dit kan uiteindelijk leiden tot de continuering van de genderongelijkheid in een veld als de Nederlandse technologische sector.

Hoe dragen netwerkpraktijken bij aan netwerkdynamiek?

Het laatste inhoudelijke hoofdstuk (H5) had als doelstelling een diepgaander begrip van netwerkdynamiek te bouwen. We weten wel hoe netwerk structuren kunnen veranderen over de tijd, maar niet zozeer hoe netwerkhandelingen (agency) daar een rol in speelt. Dit heb ik bekeken door te verkennen hoe netwerkpraktijken netwerkstructuren veranderen of juist stabiel houden, en hoe netwerkstructuren op hun beurt die netwerkpraktijken mogelijk maken of beperken. In dit hoofdstuk concludeerde ik dat netwerkdynamiek voortvloeit uit de continue interactie tussen netwerkpraktijken en inter-persoonlijke en inter-organisationele netwerkstructuren. Ik toonde aan dat netwerkdynamiek ook een inherent *politiek* fenomeen is, omdat de netwerkpraktijken die netwerk-dynamiek voortdrijven sociaal-politiek zijn. Bovendien is netwerkdynamiek een uitkomst*gedreven* en uitkomst*drijvend* fenomeen. Netwerkpraktijken, en daarmee netwerkdynamiek, worden gedreven door de doelen en voordelen die verschillende actoren nastreven, en hebben een directe (voorziene dan wel onvoorziene) impact op de projecten - door de richting van de projecten en de verdeling van voordelen voor projectdeelnemers te sturen.

Conclusie

Op basis van de studies in deze verschillende hoofdstukken heb ik in mijn concluderende hoofdstuk een "kritisch georiënteerd, praktijkgebaseerde theorie van netwerken" geformuleerd. Deze is als volgt.

(Inter)organisationeel netwerken bestaan bij de gratie van mensen die een organisatie vertegenwoordigen en de activiteiten die zij uitvoeren wat betreft hun netwerkrelaties. Netwerken zijn niet het resultaat van het hebben van een of twee soorten relaties (bijvoorbeeld vriendschap of advies) met andere actoren, maar zijn het resultaat van vele verschillende, gelijktijdige en kleinschalige acties van mensen die zijn gerelateerd aan de inter-persoonlijke en inter-organisationele netwerken waarin zij zijn ingebed. Omdat die activiteiten de basis zijn van organisatienetwerken, is het van belang te bestuderen wat deze op het microniveau inhouden, waar ze vandaan komen, en wat de gevolgen ervan zijn.

De netwerkpraktijken van mensen kunnen niet volledig begrepen worden zonder ook zogenaamde 'structuren' mee te nemen: netwerkpraktijken zijn structureel ingebed, omdat zij diverse 'sociologische' structuren zowel beïn-vloeden als daardoor gestuurd worden. Ik spreek dan over structuren als de

sociale systemen waartoe mensen behoren, zoals het intellectuele, economische, of politieke systeem (Whittington, 1992; Giddens, 1984), maar ook bestaande genderstructuren die overeind worden gehouden door genderpraktijken (Poggio, 2006). Als zodanig betekent het doen van netwerkpraktijken voor het grote deel het reproduceren, maar soms ook het ingaan tegen of veranderen van deze structuren. Dit noem ik de "dualiteit van structuur en agentschap (*agency*) van netwerken" – netwerken is zowel een werkwoord en als een zelfstandig naamwoord. Eén specifiek type van die sociologische structuren gerelateerd aan netwerkpraktijken zijn netwerkstructuren. De wisselwerking tussen netwerkpraktijken en netwerkstructuren drijven netwerkdynamiek: netwerkpraktijken hebben invloed op netwerkstructuren en ze worden tegelijkertijd ook beïnvloed door die netwerkstructuren, en als zodanig zijn netwerken geen statische dingen, maar zijn ze altijd 'in beweging'. Netwerkpraktijken zijn dus de drijfveer achter netwerkdynamiek. Netwerkpraktijken zijn dus het medium waardoor de dualiteit van agency en structuur zich uitspeelt en waardoor netwerken dynamisch worden, waartoe ook processen van macht en ongelijkheid behoren.

Netwerkpraktijken zijn inherent verweven met processen van macht en ongelijkheid. De hoofdstukken lieten zien hoe verschillen en machts- en genderongelijkheden, aanwezig binnen de verschillende structuren, worden gereproduceerd of veranderd door de netwerkpraktijken van de projectdeelnemers. Dit maakt netwerkpraktijken beladen met machtsprocessen en daarmee zijn zij sociaal-politiek. Geïnformeerd door organisationele praktijken, sociale systemen, en netwerkstructuren en -relaties, zijn de netwerkpraktijken tussen mensen van verschillende functionele achtergronden machtsmiddelen. Mensen voeren netwerkpraktijken uit om bepaalde voordelen te behalen waarvoor ze afhankelijk zijn van anderen. Omdat ze sociaal-politiek zijn, helpen netwerkpraktijken om ongelijkheden in netwerken te reproduceren of te veranderen. Netwerkpraktijken worden altijd gedaan in iemands belang en binnen een arena van afhankelijkheid van elkaar en autonomie. Dit maakt dat netwerkpraktijken sociaal-politiek van aard zijn, en reproduceren of ingaan tegen ongelijkheden.

Maatschappelijke bijdragen

Hoewel het onderzoek een theoretische doelstelling had, geeft het door het empirische werk ook inzicht in de gang van zaken binnen universiteit-industrie samenwerkingsprojecten. Hieruit haal ik een aantal leerpunten die gaan over: evaluatie van dergelijke projecten; macht en netwerken; gender en netwerken; en het veranderende idee van 'een goede wetenschapper'.

Evaluatie

Succes van een universiteit-industrie samenwerking is niet eenduidig: er zijn verschillende uitkomsten, die voor verschillende mensen meer of minder relevant zijn, en anders beoordeeld worden door hen. Bij de evaluatie van een samenwerkingsproject zou hier rekening mee gehouden moeten worden om een integraal beeld van het succes of falen van een projecten te krijgen. Ook zou hierin de kwaliteit van het netwerken, de netwerkontwikkeling en mogelijkheden voor een (duurzaam) netwerk in de toekomst meegenomen kunnen worden.

Macht en netwerken

In het licht van de politieke kant van netwerkpraktijken zou het nuttig kunnen zijn voor managers om aandacht te geven aan hoe interpersoonlijke relaties binnen hun organisaties of afdelingen tot stand komen. Dit kan inzicht geven in of medewerkers wellicht bepaalde relaties prioriteit geven en andere mensen juist buitensluiten of marginaliseren, en of politieke praktijken het bouwen van bepaalde relaties binnen een organisatie tegengaan of juist stimuleren. De gevoeligheid hiervoor ontwikkelen begint met het inzicht dat wat er om de tafel van samenwerkingsverbanden en netwerken gebeurt politiek is.

Het vaststellen van gezamenlijke doelen en een projectorganisatie die ruimte geeft voor alle partijen om input te geven en hun voordeel te behalen lijken basiscondities voor gelijkwaardige deelname in projecten zoals ik die heb bestudeerd. Bovendien suggereert mijn onderzoek dat bewustzijn van de niet alleen instrumentele, maar ook symbolische rol van objecten, zoals documenten en procedures die worden gebruikt bij het faciliteren en de ontwikkeling van interpersoonlijke en inter-organizationele netwerken, kan helpen om ongewenste ongelijkheden tegen te gaan en scheve machtsrelaties te balanceren. Mijn aanbeveling is dat netwerkbemiddelaars en projectleiders bijvoorbeeld in overweging nemen: hoe een vergaderagenda kan leiden tot het bevoordelen van sommige en benadelen van andere aanwezigen in een vergadering; wie er wordt aangesteld als projectleider en hoe dat de verhoudingen in een netwerk beïnvloedt; waar de vergaderingen worden gehouden; en wie er betrokken zijn bij het schrijven van projectvoorstellen.

In de specifieke context van universiteit-industrie samenwerking heeft een faciliterende derde partij, zoals een overheidsfinancier, een belangrijke rol in de machtsrelaties tussen de partijen. In mijn onderzoek vond ik dat een financier niet alleen financiële middelen verschaft, maar ook sociaal en cultureel kapitaal verschaft door middel van eisen die zij stellen aan projecten en hun procedures en documenten. Zodoende heeft een financier ook de mogelijkheid om machtsrelaties te beïnvloeden binnen een project. Ook het vergroten van het bewustzijn van de vertegenwoordigers van een financier over machtspraktijken

en de rol van gender tussen projectdeelnemers kan hieraan bijdragen.

Gender en netwerken

In mijn onderzoek demonstreerde ik dat netwerkpraktijken genderongelijkheid kunnen reproduceren dan wel ertegenin gaan. Door kleine, schijnbaar triviale momentane uitingen of gedragingen tijdens het werken aan een netwerkrelatie met iemand, kan een organisatiecultuur worden gereproduceerd waarin bijvoorbeeld vrouwen gezien worden als lager in status, of waarin een man een bepaalde (mogelijk beperkende) vorm van masculiniteit geacht wordt te hebben. Bewustwording van hoe gender werkt – hoe het 'gedaan' wordt – kan helpen in het langzaam veranderen van een cultuur die ten nadele kan werken van een bepaalde groep mensen, zoals vrouwen of mannen. Gender training kan aan deze bewustwording bijdragen. Hierbij kan gedacht worden aan de Implicit Association Test*; workshops over wat gender is, hoe het geleerd wordt door socialisatie, en hoe genderstereotypen gedrag op microniveau en instituties op macroniveau beïnvloeden; de gender tool box van de EU†; of rondetafel discussies waarin mannen en vrouwen met elkaar kwesties bespreken over onderwerpen en ervaringen met genderpraktijken. Gender training kan helpen om inzicht te geven in de vooroordelen die we (onbewust) hebben gedurende interacties, kennis en meer begrip geven voor andermans (/ andervrouws) ervaringen, en om percepties, attitudes, en gedragingen omtrent gender en genderongelijkheden te veranderen.

"Een goede wetenschapper"

In het huidige klimaat van groeiende nadruk op de waarde van wetenschap voor de samenleving ("valorisatie") en de groei van industriële financiering van wetenschappelijk onderzoek, zie ik dat de betekenis van 'een goede wetenschapper' aan het veranderen is. Gebaseerd op mijn onderzoek constateer ik dat wetenschappers zich niet alleen moeten identificeren met hun eigen professionele/wetenschappelijke praktijken, normen en doelen, maar ook moeten kennen en begrijpen wat de doelen en normen zijn van andere partijen zoals industrie. In mijn onderzoek zag ik dat sommige wetenschappers dit accepteerden en het gebruikten voor hun eigen belang, terwijl anderen zich verzetten tegen deze veranderingen en vasthielden aan pure wetenschap. Wetenschappers worden afhankelijker van geld van bijvoorbeeld industrie, terwijl ze tegelijkertijd hun academische onafhankelijkheid en integriteit moeten bewaken.

* *https://implicit.harvard.edu/implicit/education.html (US)*
https://implicit.harvard.edu/implicit/netherlands/ (NL)

† *http://www.gendertoolbox.org/toolbox/toolboxEN/indexEN.html*

Ze bevinden zich daarmee in een moeilijk pakket, met het risico dat wat wordt gezien als goed onderzoek in een smalle mal wordt gegoten, hetgeen innovatie kan tegenhouden in plaats van stimuleren. Een belangrijke vraag voor de toekomst is: hoe kunnen beleidsmakers en organisaties - zoals de financier in mijn onderzoek maar ook wetenschappelijke instituten en industrie - valorisatie faciliteren zonder de integriteit van de wetenschap in het nauw te drijven?

Een tweede punt wat de veranderende notie van 'een goede wetenschapper' betreft is dat deze notie ook geleerd zal moeten worden door nieuwkomers in het wetenschappelijk veld: PhD kandidaten. Omdat een PhD traject een belangrijke fase is in de identiteitsvorming van *early career* wetenschappers, is dit een passende periode voor hen om te leren over de mogelijkheden voor en spanningen gerelateerd aan het bouwen van relaties met industrie. Ik zeg hiermee niet dat PhD kandidaten de wensen van industrie moeten volgen zonder kritisch te zijn, maar suggereer dat in het huidige klimaat waarin meer nadruk ligt op valorisatie, zij zich bewust moeten zijn en zullen moeten leren te balanceren tussen praktische interesses en het bewaken van wetenschappelijk kwaliteit en integriteit. Verschillende partijen kunnen bijdragen aan het versterken van het bewustzijn van PhD kandidaten over het betrekken van praktische overwegingen in hun werk en een dergelijke nieuwe 'goede wetenschapper' te worden. Senior wetenschappers kunnen bijvoorbeeld junior academici wijzen op het belang van goede relaties met industrie; ze kunnen PhD kandidaten stimuleren om industriepartners te contacteren en bezoeken; industrie uitnodigen om hun doelen en praktijken te presenteren en demonstreren zodat PhD kandidaten het nut van onderzoek voor de praktijk beter begrijpen. Industriepartners zouden PhD kandidaten bij hen kunnen uitnodigen om de praktische toepassing van theoretische kennis te tonen; samenwerken met junior academici aan datametingen en productontwikkeling om kennis uit te wisselen; of deze junioren laten werken in hun organisaties om bruggen te slaan tussen wetenschap en industrie, zoals nu ook al veelvuldig gedaan wordt met (bachelor en master) studenten door middel van stages. Financierende partijen kunnen vergaderingen organiseren waarin PhD kandidaten en industrie deelnemen, zoals STW doet; organiseren dat PhD kandidaten samenwerken met of zelfs werken binnen industrie; of PhD kandidaten trainen in het presenteren van werk aan niet-wetenschappers.

Curriculum Vitae

Laura Berger was born on June 1st 1986 in Amstelveen, the Netherlands. She completed the Gymnasium (Grammar School) at the Sint-Janslyceum, Den Bosch, in 2004. From 2004 to 2008 she studied Business Communications at the Radboud University Nijmegen for which she received a Bachelor's degree and Master's degree (MA), with distinction. In 2007 she attended the Università degli Studi di Perugia, Italy, for one semester in the framework of the Erasmus program for international student mobility. In 2010 she completed a Master's degree with satisfaction, in Business Administration within the specialty of Strategic Human Resource Management (SHRM) at the Radboud University. For her thesis she conducted a critical analysis of diversity managers' discourse on diversity and related organizational policies.

Immediately after graduation, Laura started her PhD project at the department of Business Administration, section SHRM, on networking practices in university-industry collaboration projects. During this project she participated in a number of international conferences: Critical Management Studies (2011), Gender, Work, and Organization (2012), Academy of Management Meeting (2012) and the Colloquium of the European Group for Organizational Studies (2014). She also attended several international and national PhD courses: Theories of Sex/Gender, University of Utrecht, Netherlands (2010/11); Critical Management Studies, Lund University, Sweden (2011); Advanced Studies of HRM, Tilburg University, Netherlands (2011); International Summer School on Practice-Based Studies, Warwick Business School, Venice, Italy (2013). During her PhD project she performed several educational tasks, such as the supervision of Master's theses. She also engaged in multiple extra-job activities, such as editorial tasks for a departmental newsletter and a university PhD magazine, as well as the co-founding and governing of the university's women's network, the Halkes Women Faculty Network. In 2012 she received the Frye Stipendium, which is granted by the Radboud University to promising women PhD candidates to stimulate their scientific career. She used this Stipendium to visit professor Barbara Poggio and the Center of Interdisciplinary Gender Studies at the Università degli Studi di Trento, Italy, in November 2014. As of February 2015, Laura is working as a postdoctoral researcher in the FP7 EU project GARCIA (www.garciaproject.eu) in Nijmegen.

Notes